UNIVERSAL MODEL AIRPLANE NEWS

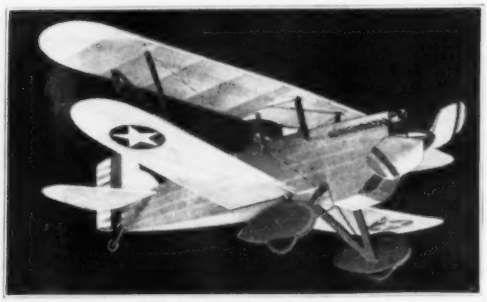
MAY 1934.

20¢

THE ONLY MAGAZINE DEVOTED EXCLUSIVELY TO EXPERIMENTAL AVIATION"

Build these Famous B P A Models

The MODELS YOU WANT *at the* PRICE YOU WANT TO PAY!

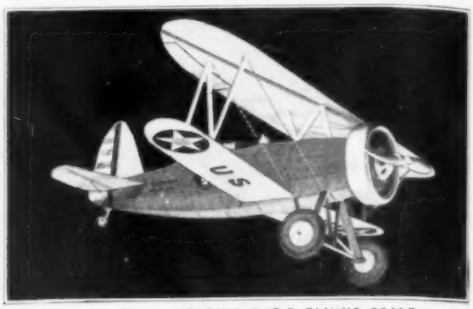


CURTISS FALCON

Big 18" wingspan model .. .. 50c post paid

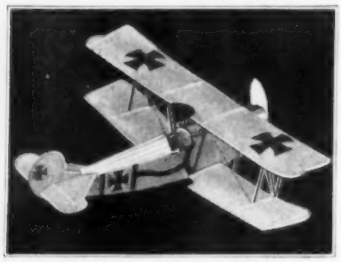
35¢ EACH POSTPAID 3 for $1

(MOST MODELS)



BOEING P-12-E FLYING SCALE

11¾" wingspan ..... 50c post paid

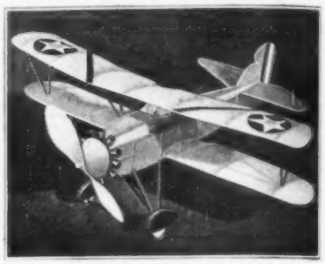


FOKKER D7 FLYING SCALE

Famous war fighter ..... 35c post paid

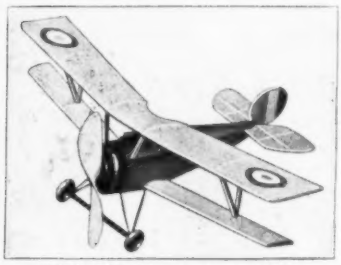
FOKKER TRIPLANE

Unique war plane .. 35c post paid



CURTISS HELL-DIVER

Used by Army officers ..... 35c post paid



NIEUPORT SCOUT FLYING SCALE

A war-time fighting plane ..... 35c post paid

MAKE your choice from the marvelous line of kits shown on this page—each is a de luxe BPA Flying Scale Model Kit—12" wing span unless otherwise noted—the kind that the best model builders prefer! BPA stands for the highest quality of kits and supplies at the fairest, lowest prices. You get quick shipping service, and money back or exchange privileges if you are not satisfied!

Dealers!

Write on letterhead for special discounts. Big profits in handling BPA Supplies. You get real service and sales support.

CATALOG FREE

Send 3c stamp to cover mailing cost. You'll be surprised to see this beautiful Catalog which PICTURES our many wonderful supply items. Send stamp with your order NOW!

NRA

GENERAL CONTENTS OF KITS

Each kit contains FULL-SIZE 3-view plans. Kits are complete with banana oil, cement, formed wire parts, Balsa, Jap tissue, turned Balsa wheels, etc. In sturdy cardboard boxes. And remember these kits reach you post paid.

SEND NO MONEY — JUST MAIL COUPON!

Order kits the convenient C.O.D. way—send no money. Mark coupon "C.O.D." and pay postman on delivery. If you send cash, use Postal or Express Money Order. Canadians add 25c on orders up to $1.50, 15% on orders over $1.50. No Canadian coins or stamps accepted—use International Money Order. Print order clearly. Satisfaction guaranteed, exchanges made, or money refunded.

B.P.A.

All prices postpaid or at your dealer

COMET MODEL AIRPLANE & SUPPLY CO.
BPA Division
2509 W. Cermak Road, Dept. M-45, Chicago, Ill.

( ) Send C.O.D. kits listed below. I will pay postman for kits, plus C.O.D. fee. No C.O.D. orders accepted for less than 2 kits.
( ) I enclose $.....for kits listed below.

NAME _____

Street _____

City _____ State _____

MONOCOUPE FLYING SCALE

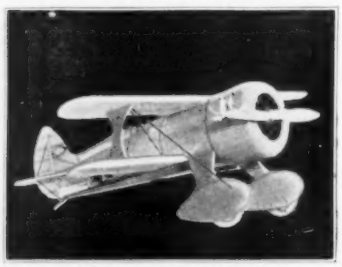
A pilots' sport plane..... 35c post paid

THE SPAD

Popular war-time fighter ..... 35c post paid

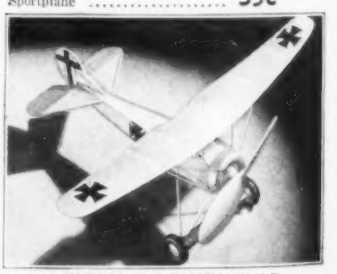
FAIRCHILD 22

Sportplane ..... 35c post paid



LAIRD SUPER-SOLUTION

15¼" wingspan ..... 50c post paid

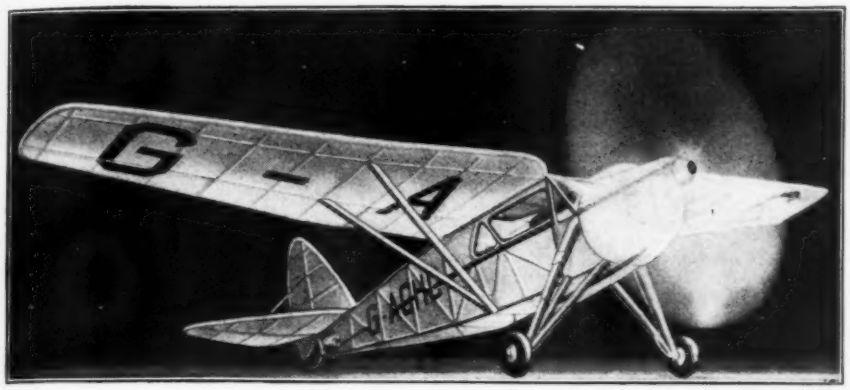


FOKKER D-8 FLYING SCALE

A great flying ship..... 35c post paid

Balsa Products Co. of America, subsidiary of Comet Model Airplane & Supply Co.

George D. Wanner's BARGAINS IN FAMOUS FLYING MODELS!



. . . all parts, plans, and photos included in this remarkable BARGAIN OFFER.

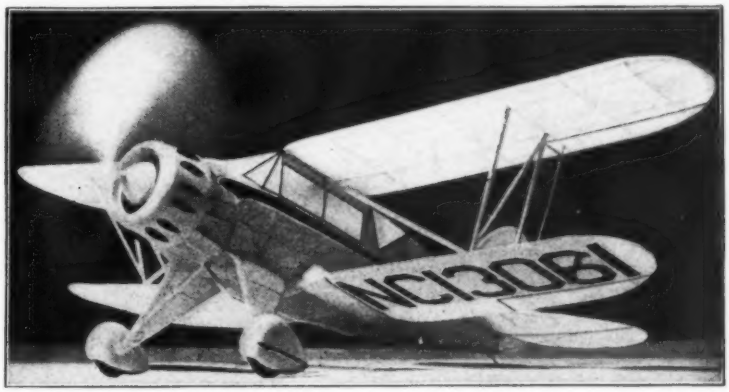
LEOPARD MOTH—D. H. 85. The very latest of the DeHaviland "Moths." Due to its superior performance, cruising speed 120 M.P.H., fuel consumption less than 6 gallon per hour or 20 miles per gallon) it replaces the popular "Puss Moth."

Winner of the 1933 King's cup race, average speed 139.5 miles per hour for 803 miles.

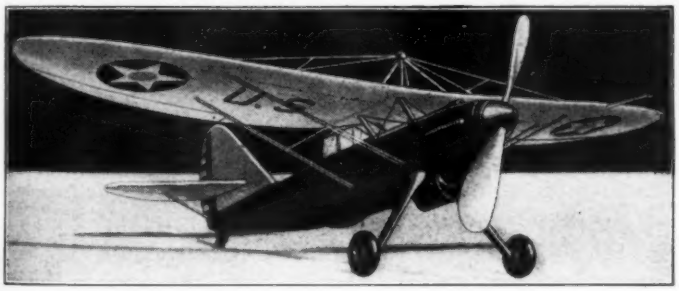
NEW FEATURES. Our model has FLYABILITY PLUS, 24" wing span, **Folding Wings**, Adjustable Aelerons and Rudder. Send in your order today for our Model No. 28. **$1.00** each

YOUR CHOICE of any of these 3 FLYING MODELS

Only **$1.00** EACH



WACO "C" Cabin Type BIPLANE. A new model, the latest of Waco's fine line. Model is extremely light when compared to large wing area and this, together with inherent stability, accounts for its unusual flying ability. Wing span 22". Send your order today for our Model No. 26. **$1.00** each



DOUGLAS Y 10-43 OBSERVATION. Our Model No. 27, the Army's newest observation plane which, in official tests, attained a speed of 200 miles per hour. Our Model is authentic to minutest detail. Wing span 24". Weight, 1.7 oz. Parasol type wing makes it an outstanding flyer. Send your order today for our Model No. 27. ..... **$1.00** each

PLANS FOR EACH PLANE INCLUDE PHOTOS!

All plans include actual photographs showing all details of construction and views of complete plane. Balsa wood is printed ready to cut out. Complete with all parts, covering, cement, rubber motor, propeller, colors, banana oil, washers, etc.

How to order:

1. Go to your dealer first. If he can't supply you, send order to us. All orders must be accompanied by postal money order or check. No stamps, please.
2. Price of kit includes postage. All kits and supplies carefully checked and packed.
3. Write for special discounts to community centers, schools, camps, Y.M.C.A.'s, etc. Prices on request for Canada and foreign countries.

DO NOT SEND ORDERS FOR LESS THAN $1.00

DEALERS!

Write for our special dealer price list and for a copy of the new Wanner Catalog just printed. Our complete line meets every dealers need and attractive prices increase your turnover. GET THE FACTS NOW!

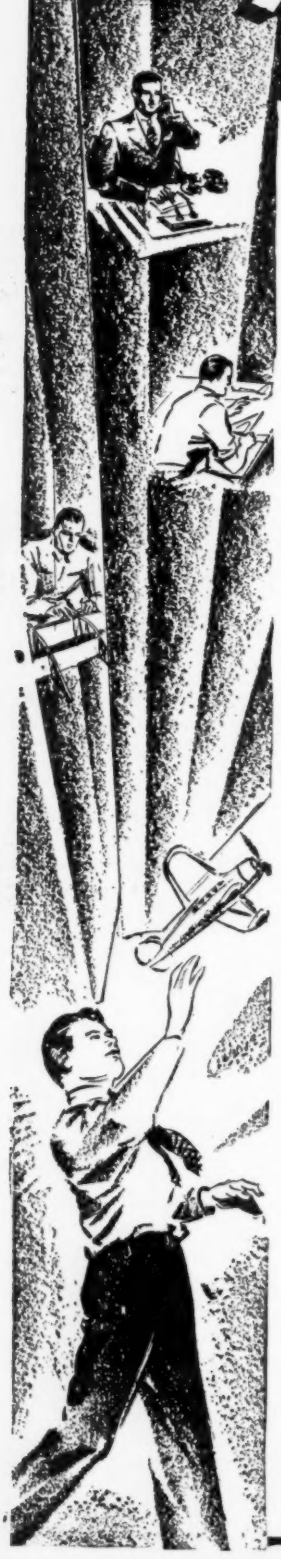
GEORGE D. WANNER & CO.

106 Webb Street Dayton, Ohio

Pioneer Designers and Builders of Model Airplanes of Quality, Service, Flyability

OFFICIAL SUPPLY HOUSE OF A.M.L.A.

Universal Model AIRPLANE News



VOL. X *No. 4*

Edited by Charles Hampson Grant

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NRA MEMBER U.S. WE DO OUR PART

In Our Next Issue

Fletcher Pratt gives you a vivid picture of the progress of Russian Aviation in Russia Spreads Her Wings.

Plans and instructions are published for the first time in America for you, to build a flying scale model of a Russian "Fighter" in Build The Russian Fighter D.1, by Elmer Pilzer.

Fundamentals of Model Airplane Building provides the beginner with the second installment of an invaluable course in model building, by Edwin T. Hamilton. (Planes designed by Charles H. Grant).

The first article of a series entitled **The Albatros Fighters on Parade**, by Joe Nieto, gives little known facts, with pictures and plans of the most famous make of German fighting airplanes.

On The Frontiers of Aviation, by Robert C. Morrison, will give some interesting information about the U. S. Army's latest fighting planes.

A wealth of interesting and instructive facts will be given in: The Aerodynamic Design of The Model Plane, How The Aeroplane was Created, Air Ways, Aviation Advisory Board, and the constantly growing N.A.A. Junior Membership News. Data on how to make Microfilm, also Contest news and rules makes the June issue indispensable to the aviation enthusiast.

Order your copy of Universal Model Airplane News from your newsdealer now.

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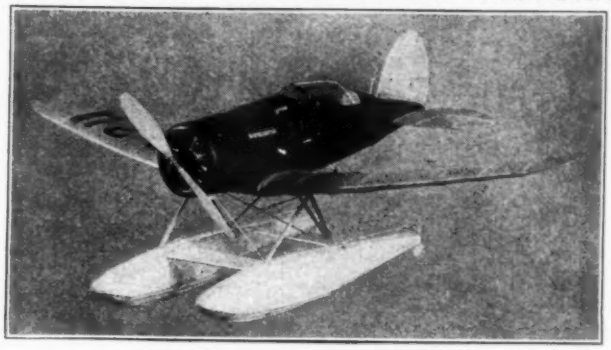
National Offers the Ship of the Hour ! !

FULLY DETAILED—FLYING SCALE MODEL OF THE LOCKHEED SIRIUS FLOWN BY LINDY ON HIS RECENT HISTORICAL FLIGHT

Here's the biggest model event of the day—a true ½" flying scale model of Col. Lindbergh's world-famous Lockheed Sirius that flew 29,000 miles around the North Atlantic. The daily headlines of this thrilling flight made great flying news. National's new Lockheed Sirius model makes the greatest model news you've had in a long time.

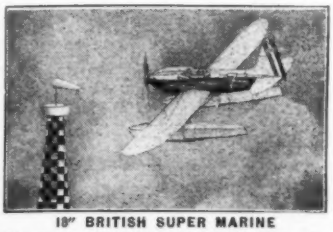
HERE'S THE STORY:

The Lockheed Sirius kit is complete to the last detail; contains a genuine three view, full size ½" scale blue print—with abundant details and instructions to guide you. All Stations are neatly printed and numbered to corespond with blue print. Other wood parts cut to size. Turned cowling, celluloid windshield and canopy. Jap silk tissue covering, dopes, cement and formed wire parts. The new safety motor shaft through which the rubber motor travels, every model builder will recognize as another ingenious National development to improve performance of flying scale models. This beautiful ½" Flying scale model has a wing span of 21½" overall length 15½", weight 1 oz. Colors, black, orange and silver. You will find it a thrill to build—a thrill to fly. The kit comes to you display packed, in a strong, sturdy box. When you open it up you see everything neatly arranged before you. Order yours today. Kit complete, $1.85 plus 15c p.p.



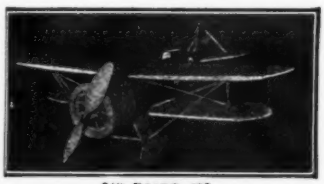
COL. LINDBERGH'S LOCKHEED SIRIUS
CHRISTENED "TINGMISSORTOG"
Complete Kit, $1.85 plus p.p. 15c

THE NATIONAL MIDGET FLEET of 12" flying scale models are easy to build and excellent performers. They have earned a reputation for quality, accurate and authentic design. Each Kit contains Genuine full size Blue print and instructions, Printed stations, Formed wire parts, wheels, insignia, colored Jap tissue, Rubber Motor, and Cement. They offer outstanding values at 25—35—50c each plus 10c p.p. Designed for performance, not for price.



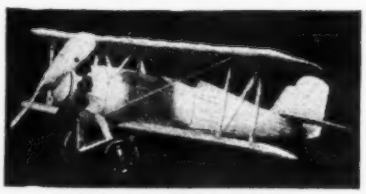
18" BRITISH SUPER MARINE

This modern plane of the British Air Corp. is a demon for speed. The Model as pictured is a perfect miniature. Colors blue and white with British Insignia. Complete kit with full size blue print. Plus 15c p.p. **$1.00**



24" LAIRD 400

This famous sport model as flown by Maj. Doolittle and other well known pilots has hung up many records. Weight of model 2 oz. Colors green and orange. Const. Kit complete ..... plus p.p. 25c **$2.50**



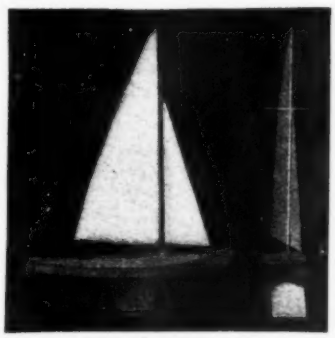
24" NAVY VOUGHT CORSAIR

A famous Plane of the U. S. Navy. The Model furnished in its perfect matching colors, insignia and all other detail's assures you a perfect miniature flying scale replica. Const. Kit complete .....plus 25c p.p. **$2.75**

BUILD THIS FAST BOAT

The New, Easy, Interesting Way

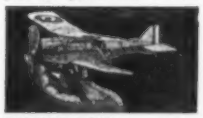
Exercise your craftsmanship, but avoid tedious labor. It's all pleasure building this perfectly balanced, accurately detailed Sharpie from the 80 parts furnished. Hull, deck, rudder and cradle parts die-cut, ready to assemble. Cockpit floor boards and other wood parts cut to shape. Lead weighted aluminum keel. Complete rigging, 28 formed wire fittings, dopes finishing material and a detailed illustrated instruction manuel to guide you.



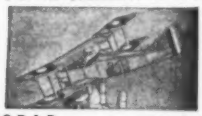
TWENTY-INCH SAILING MODEL
"SHARPIE"
In Jute Fiber
Waterproofed Construction Kit
Complete With Illustrated Manual
An Entirely New Method of Model Boat Construction
Plus 25c P.P. **$2.00**

FOKKER D-VIII
plus 10c post..... **25c**

TAYLOR CUB
plus 10c post..... **25c**



BRITISH S.E.5
plus 10c post..... **35c**



S.P.A.D.
plus 10c post..... **35c**

AKRON FIGHTER
plus 10c post..... **50c**

FOKKER TRIPLANE
plus 10c post..... **50c**

OTHER MIDGET MODELS

Other 25c Midgets
Heath-Parasol
Curtiss-Robin
Puss-Moth
Bellanca Liberty

Plans only 10c
Postage 5c

Other 35c Midgets
British Sopwith
Camel
German Fokker D-VII

Plans only 10c
Postage 5c

OTHER 50c MIDGET MODELS
Post., Packing and Ins. 10c Extra

(New) Hawk P-6-E
Curtiss Falcon
Curtiss Helldiver
Texaco 13
Gee Bee Super Sportster 1931
Lockheed Sirius
Lockheed Vega
Laird 400
Albatros
Pfalz
Nieuport Scout
British Hawker Fury
Polish P-6
Sikorsky Amphibian
Bellanca Airbus

National DeLuxe Solid ¼" Scale Replica Models

THESE CONSISTENT PRIZEWINNERS

confirm the accurate and full detail of each blue print, as furnished to guide you, and the completeness and quality of material contained in each kit.

SPAD NIEUPORT TEXACO 13 LAIRD 400 GEE BEE

Complete Kits 25c each, plus 10c p.p.

ATTENTION MODEL ENGINEERS!

Limited space permits showing only a few National Kits. The Bulletin features more than 50 models—complete assortment of supplies and other valuable information. Send 3c stamp today for your copy.

Dealers and Agents

National Kits and Supplies are in demand by model builders everywhere. Dealers featuring this quality line are enjoying continuous repeat sales. Write today for dealers' discounts.

Canadian Distributor
St. Johns Bros. & Twomey
644 Portage Ave.
Winnipeg, Man., Canada

Canadian prices 40% higher to cover duty.

NATIONAL MODEL AIRCRAFT & SUPPLY COMPANY

23 Avenue "E," Bluebird Building, Dept. A-47 New Rochelle, New York

for Quality
for Service
for Value

MADISON maintains a standard hard to match . . . compare Madison's Supplies with others . . . They simply CAN'T BE BEAT!

BALSA WOOD
Our Balsa Wood is the lightest and best balsa to be had. It is clear straight grained stock, cut to convenient sizes.

36" Strips

1/16x1/16	.10 for .05
1/16x1/8	.8 for .05
1/16x1/4	. 6 for .05
1/8x1/8	... 5 for .05
1/8x3/16	.. 4 for .05
1/8x1/4	... 3 for .05
1/8x3/8	... 2 for .05
3/16x3/16	. 3 for .10
3/16x1/4	.. 3 for .11
1/4x1/4	... 3 for .12
1/4x3/8	... 3 for .13
1/4x1/2	... 3 for .14
3/8x3/8	... 3 for .15
3/8x1/2	... 3 for .16
1/2x1/2	... 3 for .17
1/2x1	..... 3 for .20
1x1	..... 1 for .12

40" Lengths

1/8x3/8	... 1 for .05
1/8x1/2	... 1 for .06
3/16x3/8	.. 1 for .07
3/16x3/8	.. 1 for .08

DUMMY RADIAL ENGINES
Celluloid, 9 cylinders, 3" diam.
Each 35
1½" diam 20

PROP BLOCKS

1/2x3/4x5	. 5 for .05
1/2x3/4x6	. 4 for .05
5/8x1x7	..3 for .06
5/8x1x8	... 3 for .07
3/4x1⅛x8	..3 for .08
3/4x1⅛x10	2 for .09
3/4x1⅛x11	2 for .11
7/8x1¼x12	2 for .13
7/8x1½x12	2 for .15
7/8x1½x14	2 for .17

DOWELS
Straight-grained genuine birch dowels in the following sizes:
1/8 diam.—
18" long 6 for .05
3/16 diam.—
36" long 3 for .05
1/4 diam.—
36" long 2 for .05

COLORED JAP TISSUE
Newest thing for covering your models; Colored Jap Tissue, Red, Blue, Green, Orange, Brown, Yellow and Black.
Sheet 07
Per Doz. 75
Wood veneer paper model work.
Sheet 20x30 15

EXTRA THIN TISSUE
Absolutely the lightest covering material known to be had anywhere at any price. Use it for covering your endurance models.
Sheet 20x15 05
Doz. 50

ALUMINUM LEAF
Pure sheet aluminum .0003 of an inch thick; 1/10 the thickness of writing paper. It is light, strong and makes a beautiful covering job.
3½ inches wide
5 for .05

COLORED DOPE
Real pigmented aircraft dope. Do not confuse this with dopes of inferior quality. Red, Blue, Black, Yellow, Orange, Olive Drab, Silver. Order by color.
2 oz. can.....15
4 oz. can 20
Pint 90

BAMBOO
Tonkin straight-grained, no-knot bamboo in the following sizes:
1/16x1/4x15 01
Per doz 08
1/32x1/4x8 .....00½
Per doz 04
1/16x1/16x9—
doz. 03

MUSIC WIRE
Strong, light and stiff. Sizes: .014, .020, .028, .034. 4 ft. packages, 1 ft. lengths 02
Annid. Wire 5 ft. .02

PLANK BALSA

1x3x36	.30
1x6x36	.45
2x3x36	.45
2x6x36	.85
2x5x40	.85

ACETONE
To thin out your heavier liquids.
2 oz. can.....11
4 oz. can.....18
Pint 70

COLORLESS CEMENT
Absolutely the strongest, lightest and fastest drying colorless cement on the market. Try Some Now!
1 oz. tube.....13
2 oz. can.....17
4 oz. can.....32
Pint 1.00

N.A.C.A. COWLINGS
No dummy motor needed when this cowling is used. Has a hole for thrust bearing in the nose.
1½" diam. 19
2" diam. 21
2¼" diam. 27
3" diam. 30

TWILL BRUSHES
For finishing models ea. 05

NRA MEMBER U.S. WE DO OUR PART

FREE!

With each purchase of $1.00 or more, complete kit to build a lifetime replica of Famous Dirigible LOS ANGELES with MOORING MAST. Kit includes everything! Send your order NOW!

NRA MEMBER U.S. WE DO OUR PART

ALUMINUM TUBING

1/8 outside diam., per ft.	.07
3/16 outside diam. per ft.	.11
1/4 outside diam., per ft.	.13

SHEET ALUMINUM
12 inches wide.

.005 per ft.	.12
.010 per ft.	.19
.003 per ft.	.12

CLEAR DOPE
This is real nitrate dope thinned down to meet the requirements of model airplane usage.
2 oz. can.....13
4 oz. can.....25
Pint 90

SHEET BALSA

1/32x2x36	1 for .03½
1/16x2x36	1 for .04½
1/8x2x36	1 for .06
3/16x2x36	1 for .08
1/4x2x36	1 for .10

RUBBER
Delivers more turns to the foot. Four sizes to select from at the lowest prices in America!
.045 square
25 ft. for .08
3/32 flat
25 ft. for .10
1/8 flat
25 ft. for .12
3/16 flat
25 ft. for .15

JAPANESE TISSUE
A strong, light tissue for covering your commercial models.
Sheet 20x24
3 for.... .08
Doz. .... .27

PLANS
24" Flying Model Travel Air "Texaco 13" 25c
Bellanca Pacemaker Flying Scale Model 14" 15c
Lockheed Vega Winnie Mae Flying Scale Model 15".15c
Cabin Tractor ..10c
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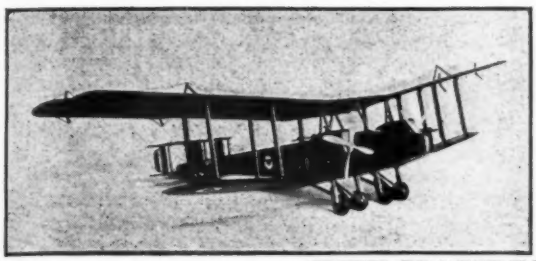
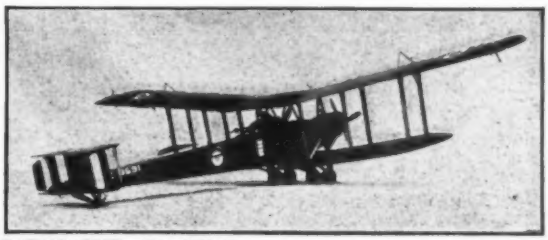




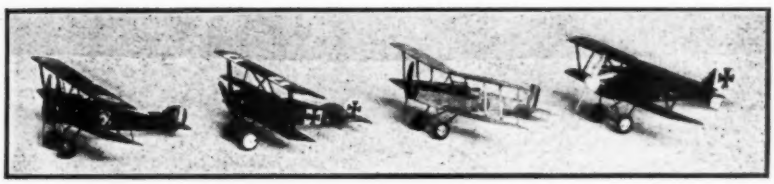
THE HANDLEY-PAGE O-400

The Handley-Page kit contains all wood parts CUT TO OUTLINE SHAPE, two scale die cast four bladed propellers, four die cast Lewis machine guns (scale), four wheels, all insignia and numerals, scale bucket seats, two large bottles of green paint, one large bottle of shellac, one vial of black, and one vial of buff paint, one exact scale drawing full size for 1/4 inch scale model, wire, tubing, etc., comprise the kit set. When you consider that the wings, fuselage, tails, and rudders are cut to outline shape and NOT blocks of wood; propellers, machine guns, and bucket seats are made; you get a full size plan, and more paint and glue than you need; you will realize that we have produced a very superior kit set. The Handley-Page has a 25 inch wingspan.

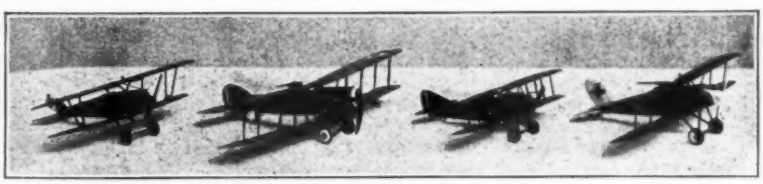
Over ten pictures, a plan, and several pages of data were used while making the plan and the model pictured above. We therefore feel sure that the plan and the model are exact in every detail.

Handley-Page Kit Set $3.00

Don't fail to build this famous World War Bombing Plane.



CAMEL FOKKER S. E. 5A ALBATROSS



Pfalz D111 BRISTOL FIGHTER SPAD 13 HALBERSTADT

Ansaldo-S.V.A.

The Ansaldo-S. V. A. is starting a new series of our 1/4" scale model kits with more accurate plans, including information about the real plane. The kit contains the same materials as the other small war plane kits listed on this page.

Here are nine World War planes you can build. Each plane when completed will be exactly to scale, 1/4 inch to the foot, of the plane it copies. All wood parts as, fuselage, wings, tail and rudder are cut to outline shape from Balsa. This leaves only the hand finishing to the builder. A scale die-cast propeller ready for mounting, cement, full size 1/4 inch scale print, wheels and struts are in each kit. Remember all parts are cut out and *NOT* blocks of wood as are furnished in the sets selling for less. You also get all the necessary insignia. The kit sets for any four of the planes pictured here can be had for $1.50. (This does NOT include the Handley Page). Separate kits at 50 cents each.

These kit sets contain scale cast machine guns and scale bucket seats.

HAWK MODEL AEROPLANES

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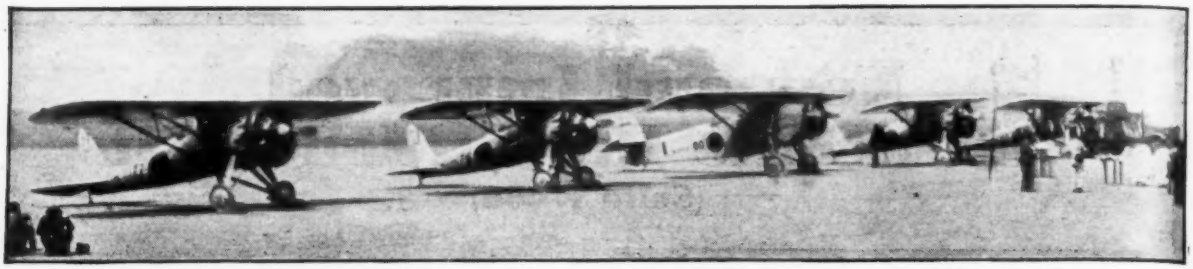


New Nakajima Army type 91 single seater fighters ready to fly to the Manchurian front. Speed 198 m.p.h. (Acme)

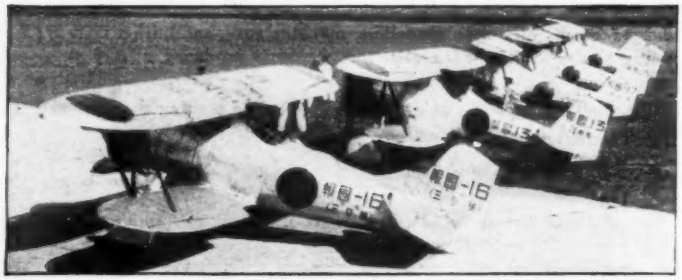
Sky Fighters of the Rising Sun

The Inside Story of Japan's Modern Air Force and How She Trains Her Future Aviators by Means of Model Airplanes

By FLETCHER PRATT

THE beginning of the Japanese air service dates from the fighting at Shanghai in the fall of 1931, just as the beginning of modern Japan dates from Commodore Perry's arrival in 1854.

It is true that before the battle of Shanghai the Japanese army had seven air regiments and the Japanese Navy four of the finest aircraft carriers afloat and a dozen squadrons of war planes. But it didn't mean anything; the Japanese air service, like the Japanese nation before Perry arrived, was about a thousand years behind time.



Some of Japan's latest planes, Nakajima Navy, type 90, single seat shipboard fighters. Speed 192 m.p.h. (Acme)

It took the Shanghai attack to prove it. One of the navy's aircraft carriers came up the river and a couple of squadrons of army planes arrived on transports and took off from shore bases to lay their explosive eggs on the Chinese positions. The job looked easy and they did not anticipate much resistance except from ground rifle fire.

And then, up from the Chinese lines, there buzzed the weirdest collection of fighting planes ever gathered in one spot. There were one or two new Hawker Furies and a couple of Swedish Jaktfalks, but the rest looked like a museum exhibit of all the crazy and antiquated aircraft in existence—home-made planes built by native mechanics who didn't know a fuselage from an aileron; unsuccessful experimental monstrosities bought up cheaply by some Chinese war-lord; even a couple of old Curtiss Jennies and a war-time Albatros. The pilots were just as queer a lot—White Russians exiled by the Bolsheviks, American and German soldiers of fortune and young Chinamen just out of schools.

They only had one thing in common—they were anxious to fight. They piled into two hundred Japanese planes with the forty old crocks they had, and what they did to that expensive Imperial Aviation service was a shame.

Shipboard fighters used by the Japanese before the Manchurian war. They resemble French Salmsons used during the World War (Acme)

Of course it couldn't last. The airmen of the Rising Sun are rabid fighters themselves. They rallied after the first surprise and shot down every one of the Chinese museum pieces, diving right into them when they couldn't halt them any other way. But when it was all over and the pieces picked up, the Japanese awoke to the fact that their aviation service was weak in the knees. Their machines were out of date (pursuit flyers at Shanghai were riding Japanese-built modifications of war-time Spads and Nieuports), their squadrons couldn't keep formation, the bombers couldn't hit anything, and the pilots couldn't fly. What could they do about it?

What they did do was courageously admit that things had gone wrong and start in all over again—from the bottom. They had the worst conditions to contend with in developing a nation with wings that any country of the world had to face unless maybe Switzerland. Japan is made up of small islands, full of mountains that make bad flying, with every square inch of flat land under rice fields, which make impossible landings. There is no such thing as a forced landing in Japan; a pilot whose motor goes dead can take his choice of cracking up on a mountain or drowning in mud in a rice field. Oil and gas, dural and rubber, must all be imported and are outrageously expensive. The climate is mostly rain, with a few volcanic eruptions for variety. The whole aviation situation, in fact, is just a lot of grief.

But the government went after the question of giving the nation a first class air service with typical Japanese energy and thoroughness. Commissions were sent out all over the world to study aviation and bring back the best ideas found in other countries. When they reported, the old manufacturing methods were tossed out the window and American mass production systems installed in

A beautifully built solid scale model of a Japanese Army bomber by a member of the Tokyo Model Airplane Club

Note the fine workmanship on this scale model of an American Sikorsky Amphibian

the factories. French army experts were hired to train the rejuvenated service in the latest air tactics. Air mail and passenger lines were started up. Army and navy pilots were encouraged to make long flights for medals and promotion. Private citizens were offered flying lessons at cheap rates. Prizes were put up for the best performance aircraft designed and built in Japan.

Meanwhile the newspapers took the question up. Characteristically they had no hesitation about saying that the air service was pretty terrible. Characteristically also, they declared, it was the patriotic duty of every citizen of Japan to help his country make up for lost time. Aviation news went to all the front pages. When an army flyer, getting leave from his duties, undertook a long hop across the China Sea to Formosa —1300 miles—in a little Puss-Moth, he got more headlines than anyone since the days of the Russian war and Admiral Togo and was received as a national hero, with flowers thrown at him in the streets and his picture in all the windows of the capital.

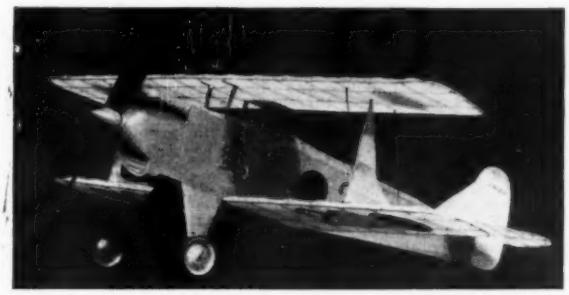
Seeking for the reason as to why the western nations were going ahead so fast in the air, some of the papers found it in the organization of the model clubs in the United States and England, which were bringing up the youth of those countries as potential flyers. They fastened on this clue, and soon every paper in the country was offering prizes for the best models and backing the organization of some builders' club.

At that time there was only one organization of the kind in the Empire, and it had only about a hundred members. They were well behind the American and other foreign clubs. Racing models were still usually the old A-type pushers, and the Japanese record for distance was about 900 yards. But if Japan is potentially the worst country in the world for full-sized aircraft, it is potentially the greatest country in the world for model planes. An unlimited supply of bamboo, which is about the best general material for models we can think of, grows in every back yard and can be had for the asking. Silk is almost as cheap as paper, and Japanese papers are the lightest, best and strongest in the world—they build houses of them. Moreover, the average Japanese boy, at the age when he would be playing with trains in this country, is already learning to make tiny models of all sorts of things, with a patience and skill that it takes westerners years to learn. Finally, the average Japanese man or boy, when he gets through work, likes to do his playing out-of-doors. In short, building and flying models is something that appeals perfectly to the temperament of the Flowery Kingdom.

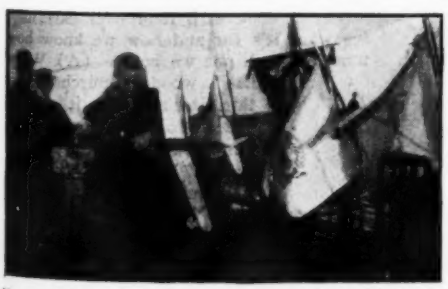
So it was hardly surprising that when all this encouragement was given to the model builders, things began to happen at once. The original model association soared rapidly in membership from one hundred to over five hundred. Branches and similar organizations sprouted like mushrooms all over the country, even tiny fishing villages turning out to fly models in the cool of the evening. Today Tokyo alone has seventy such associations, their members ranging in age from 15 to 50 and in profession, from street-sweeper to banker. You can see them out any day in all variations between the traditional kimono and modern European dress, flying models earnestly and excitedly. When you figure that Tokyo, which contains less than five per cent of the population of the country, has these 70 model groups alone, one of the groups containing 500 members, and 25 minute flights with scale models have become common, you can see how rapidly airplane model building is becoming the national sport of the country.

Naturally, the Japanese have developed their own technique at model building, in keeping with the national characteristics and the materials available. There are two main lines of development in flying models there today. In one type bamboo is used for most of the structural

(Continued on page 41)



A flying scale model Kawasaki 92 fighter of 24" span by Moriichi Kitamura. It has flown 650 ft. Plans for it appear on pages 15 to 19



A young Japanese adjusting his plane for a flight at a recent contest at Hamamatsu. Competitors came from every city

Mr. Moriichi Kitamura

He was one of the judges at a recent model contest in which all the branches of the Tokyo Model Airplane Clubs competed

Mr. Sato and model enthusiasts with a model plane typical of those flown in contests five years ago

Fundamentals of Model Airplane Building

A New Complete Course in Model Airplane Building for Beginners Who Wish to Become Expert

PART NO. 1

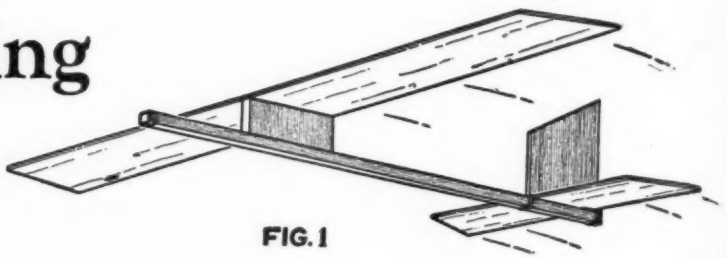


FIG. 1

By EDWIN T. HAMILTON

EDITOR'S NOTE

How can I learn to build successful model airplanes and compete with experts? This is the burning question which stares approximately 200,000 model builders in the face every year. Most of the literature on model airplanes has catered to the builder who already knows how to build and fly model planes. Those new to this art have been left to shift for themselves and to pick up haphazard information as best they could.

The function of Universal Model Airplane News is to promote model building and flying universally among novice and expert, and thereby to further knowledge of aeronautics.

We therefore take great pleasure in presenting this valuable course by an expert in the art and a well known author, Mr. Edwin T. Hamilton. In collaboration with the editor, he will endeavor to make this the greatest course in Model Building ever presented.

These articles are not primarily for the experienced builder but for the novice. Each month an actual model will be built on these pages so that the builder will learn the fundamentals of the art of doing the operations explained.

Complete plans, diagrams, illustrations and step-by-step instructions will accompany each model. With each succeeding article, the models will become more complicated, embrace greater building problems and present the reader with more advanced methods.

In this progressive manner all phases of model airplane design, construction, assembly and operation will be fully covered in such a way as to make its mastery assured. The collection of these articles should prove a valuable treatise on the subject.

Not long ago a friend of mine asked me, "How can I learn to become a model builder?" I have often been asked this question, and my reply invariably is, "By building models." That may seem a most unsatisfying answer, but its worth is to be tested by these articles, for we are going to learn model airplane building by doing just that—building models.

Each month, a different model will be used to illustrate certain principles in construction. Plans, illustrations, diagrams and step-by-step instruction will accompany each one. In this way the new modeller will not only learn to master each step, but will find himself in possession of a really worthwhile flying model.

The glider given here has been chosen for its simplicity. It incorporates many important steps in model construction and yet is not too difficult for the beginner who has never handled a piece of balsa wood in his life.

Before starting any actual work, a thorough understanding of what you are going to build is essential. To gain this, read every word of these instructions. Refer constantly to both plans and illustration. Do not proceed with the next step until the first one is understood perfectly.

Note that the plans accompanying this model are not given full-size. It is true that full-size plans are a great convenience, but they teach nothing except the art of copying. All of us learned to do that in kindergarten, but none of us learned to read plans. Many model builders lack this knowledge but the time is bound to come when they will wish they had it. Those who read these articles are going to learn to read plans exactly the same as the great builders of today who make real planes, raise our great buildings and build our railroads. They do not work from full size plans, although their work is ten times as difficult as ours. We are not going to either. Let's build our models from plans exactly the same as our engineers build the real ships. In this manner we, too, will be able to step into their shoes some day and carry on.

The first step in building anything is to obtain the materials from which to build it. The model given here is of a type called "all balsa," which means exactly what it says—that all parts are of solid balsa wood. Solid balsa wing, rudder, elevator, motor stick and elevation block. Locate each of these parts on the plan. Study their dimensions, locations and general form. Each appears in the plan under its proper name.

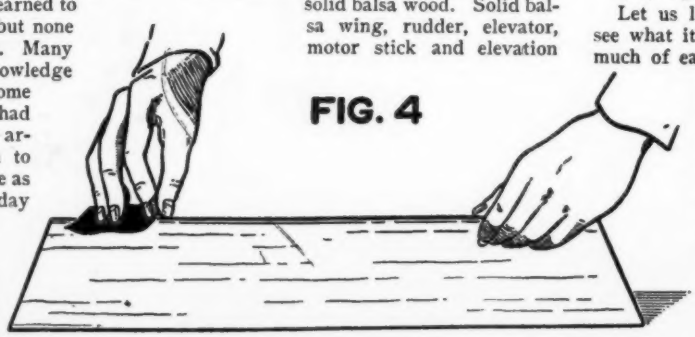


FIG. 4

In the advertising section of this magazine will be found a hundred different model airplane supply houses that sell balsa wood. One of the greatest aids to any model builder is to build up a "catalogue library." Write to all the companies offering catalogues. Get them and then sit down and really study their contents. in them you will find prices, grades, sizes and other important data on balsa wood, rubber, accessories, etc. In this way you will learn which company handles certain materials which you prefer, which prices are the most reasonable and how to obtain exactly what you need.

As the work progresses you will learn to figure from the plans exactly the materials required and how much of each will be needed. For this model we must purchase the following:

(A) 1 piece, 1/16″ thick x 5″ wide x 15½″ long, sheet balsa.
(B) 1 piece, ¼″ thick x ¼″ wide x 11″ long, balsa stick.
(C) 1 piece, ¼″ thick x 1″ wide x 2½″ long, balsa block.
(D) 1 rubber band.
(E) 1 foot soft wire.
(F) 1 can model airplane cement.
(G) 1 sheet No. 00 sandpaper.
(H) 1 package model pins.

Let us look each item over carefully, see what it's for and how we know how much of each one we need. (A) When balsa wood is purchased in thin sizes or sheets, it is called "sheet balsa." How do we know we need a sheet measuring 1/16″x5″x15½″ long? Let's turn to the plan and find out. Our main wing measures 1/16″ thick, as do the elevator and rudder. Note in each of these pieces on the plan, the notation "1/16″ balsa."

As long as all three pieces

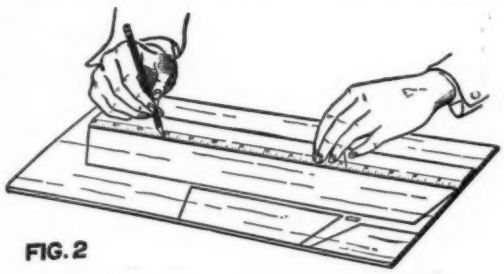


FIG. 2

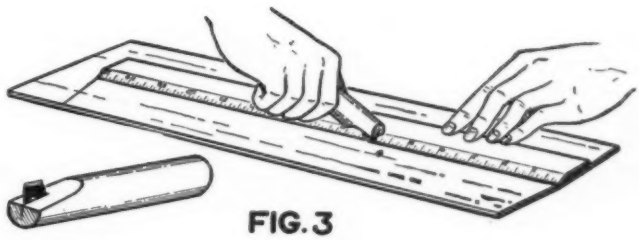


FIG. 3

are of the same thickness, we can order one piece of sheet balsa of that thickness and then cut each part from it. However, to do this we must measure the width and length of each part. When determining anything of this nature, always start with the longest part, which in this case is the wing. Note on the plans that our wing is 15″ long on its longest side. As the combined length of the elevator and rudder is less than the length of the wing, we know that a piece of sheet balsa 15″ long will prove long enough to cut all the parts from. As the ends of our wing will require cutting and sandpapering, an additional ½″ is added to the total length for safety, which gives us the length of 15½″ for our piece.

We now have the required thickness and length and have only to figure the width of the piece before ordering. The width of the main wing is 2½″ wide, while the width of the elevator and rudder is 2″. As we know the rudder and elevator must be cut from the same piece as the wing, we add the width of the wing and the width of one of the other parts to gain the total necessary width of the piece.

By adding 2½″ and 2″ we know our sheet balsa piece must be 4½″ wide, and as they must be cut out, shaped and then sandpapered, all of which cause certain waste, we add an additional ½″ to the width to have plenty of spare wood for these operations. With 4½″ of actual width and ½″ for any waste, we know our board must be 5″ wide. Some builders purchase boards considerably wider and longer than necessary so as to have extra material in case of an accident. This is good practice and is heartily recommended. In Fig. 2 will be seen the positions of each part on this board preparatory to cutting. Note the long wing at the top, the short rudder just below it in the corner and the longer elevator next to it. In the plans at the upper right hand corner will be seen a small block which is used to give the elevator elevation. Note that its thickest portion is 1/16″. It too, can be cut from this board of 1/16″ balsa and it may be seen in Fig. 2 between the wing, rudder and elevator.

Our next consideration is item "B." This calls for a balsa stick which is known as a "motor stick" in models having rubber motor. For gliders such as this one it actually forms the fuselage to which are attached the wing, elevator and rudder, although the rudder in this case is really cemented to the top-center of the elevator.

As may be seen in the plans, this stick is ¼″ wide, ¼″ thick and 11″ long. Very little work is required for finishing, and as sticks may be purchased this size, one should be ordered exactly this size. Lengths often differ and you may find it necessary to cut a longer stick to the required 11″, but aside from finishing smooth with sandpaper nothing more is required.

Item "C" is another type of elevation block and in this case is used for the wing.

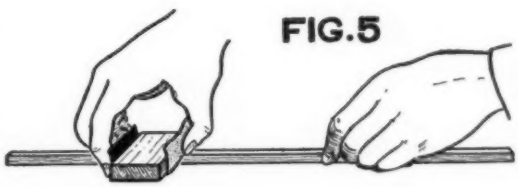


FIG. 5

Turn to the plans under "Front View" and you will locate this part under "Block." Its side view is shown under "Side View" in the plans. As it fits and covers the top of the motor stick, it must be ¼″ thick. As it extends the full width of the wing, it must be 2½″ long and as it raises the wing 1″ above the stick its width must be 1″. Be sure to cut it so the grain of the wood runs across the block. These items complete the list of necessary balsa wood.

Item "D" is any ordinary rubber band large enough to stretch at least 2½″ long. It is used to hold the elevator in position on the stick. It is shown in the plans under "Side View" and "Plan" by its proper name "Rubber Band." In Fig. 6 is shown how it is applied.

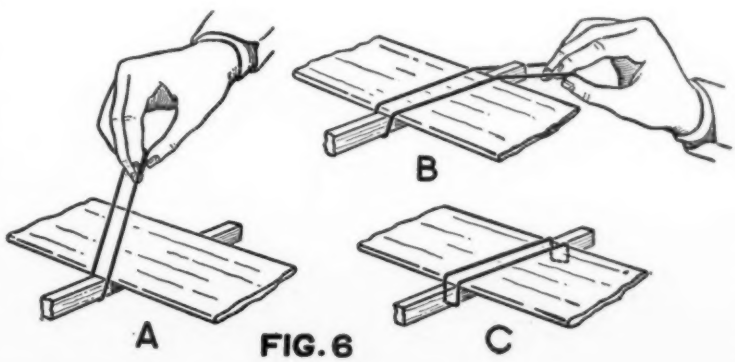


FIG. 6

The soft wire (E) is used to wrap around the front end of the stick to make the model balance at its proper center of gravity, which appears in the plans under "C.G." A small can of model airplane clear cement (F) should be purchased, as well as one or more sheets of No. 00 (very fine) sandpaper (G). Tiny model pins (H) are very useful for a hundred different reasons in model building. For this model we use them to hold the block in place on the stick until the cement has hardened, which takes only a second or two. These complete our necessary materials. Gather them together on any empty table and let's get to work!

Our first job is to lay out the wing, rudder, elevator and small elevation block on our sheet balsa piece. Study each part. Note that they have their ends cut at a slight angle. Lay out each of these pieces as shown in Fig. 2. When measuring them, make each a perfect rectangle. Then measure along one long edge of both the wing and elevator and mark points ½″ in from each end. Join these points with the ends of the other edge, which completes their form. The rudder has a 1″ angle on only one end. Measure this and join it with the other end. Test to see that the sides of all pieces are parallel with each other and the proper distance apart.

We are now ready to cut out these parts from the balsa sheet. A razor blade is best for this work, although if you have a sharp knife and cannot locate a razor blade, it may be used. A small cutter can be easily made, as shown in Fig. 3. It consists of a 6″ length of dowel stick or a broom handle, cut at a slant at one end and then slotted to take a safety razor blade. Cement the blade in place.

Whenever cutting balsa wood, use a steel edge school rule to guide your lines, cut very slowly and take care that your cuts are slightly outside the lines. When each piece has been cut out, they should be finished with sandpaper. Whenever using sandpaper, always stroke with the grain of the wood. For rounded edges, such as is required for the wing of our glider, use the sandpaper in the bare hand, as shown in Fig. 4. Note that one hand holds the wing on edge, while the other hand sands the other edge. Lightly sandpaper both

faces of all parts, round both edges of the main wing, as shown in the plans under "Side View" and leave the other parts with squared edges. When using sandpaper on flat surfaces which you wish left flat, always use a small block of wood, as shown in Fig. 5.

Study the form of the small elevation block shown under "Side View" in the plans. Note that it is given the form of a wedge, being the full 1/16" at one end and tapering off to 1/32" at the other. Complete this piece by sandpapering it to proper shape. This completes the wing, rudder, elevator and elevation block.

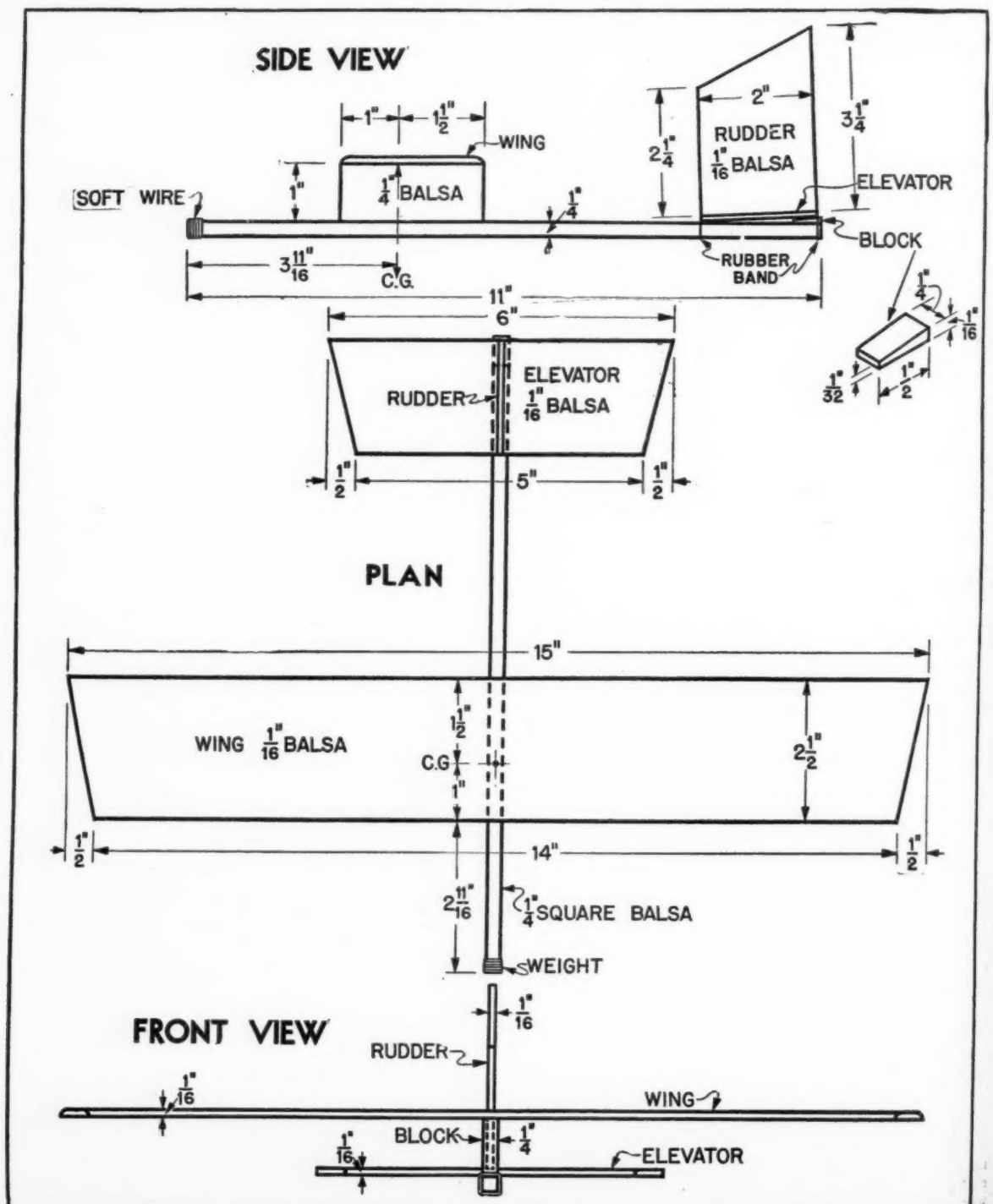
The wing elevation block requires no work except cutting to exact size, which is ¼"x1"x2½" and then sandpapering smooth. Do this lightly so as not to cut down its size.

Cut the ¼"x¼" stick of balsa exactly 11" long and smooth with sandpaper used with a block of wood so as to prevent rounded edges. Note this in Fig. 5. All parts are now finished and we are ready to assemble our glider.

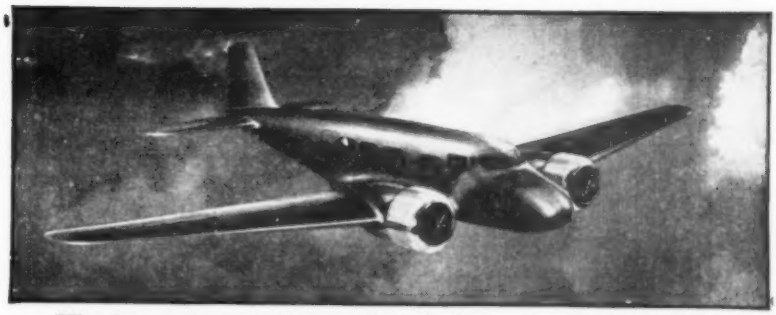
Assembly

When all parts of a model have been correctly and carefully finished, many model builders ruin their good work by hurrying and making a poor assembly.

(Continued on page 45)



On the Frontiers of Aviation



There is unusual grace in this new twin-engined 12 passenger Lockheed Electra

Features and Performance Details of the Latest Transports and How You Can Build Solid Scale Models of the Lockheed Electra and Orion

By ROBERT C. MORRISON

THE announcement of the MacPherson Robertson Air Race from London, England, to Melbourne, Australia, has aroused much interest among aeronautical racing circles here, probably because there is a purse of over $75,000 at stake.

As mentioned in last month's article, Jimmie Wedell is contemplating building a plane for this race. He already has a plane on hand capable of participating in the contest, his record-breaking Wedell-Williams "Special", but he desires an even faster ship.

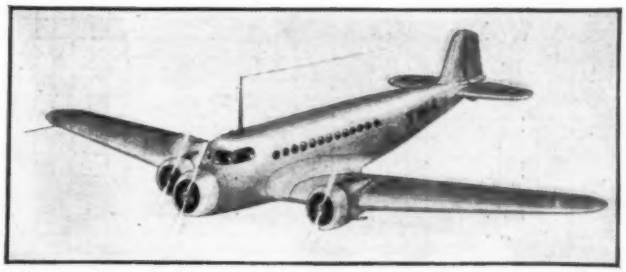
Clyde Pangborn who circled the globe with Hugh Herndon, on which flight they spanned the Pacific Ocean non-stop, is looking over the late Claire Vance's high speed "flying wing" that has been lying idle for a year. He hopes to fly it in the 12,000 mile race.

The late Mr. Z. D. Granville of Gee Bee fame designed a racing plane that stands a fine chance of winning the $55,000 first prize.

There are rumors that Lockheed and Northrop are building planes to participate and it is likely that many more companies will follow suit. The MacPherson Robertson Race offers an excellent opportunity for the United States to prove the exceptional performances of her planes by competing with those of numerous other countries. The result may be that of stimulating our world trade.

Lately there have been very strong rumors that the Boeing company is planning a new transport! It is said to be much larger and faster than the present 247s, which are now being equipped with new engines to increase their speed, in order to compete with TWA's forty-one Douglases. The Douglases will be flown daily on a two-stop trans-continental schedule. The new engines for the Boeing 247s are the reliable Pratt & Whitney geared Wasps.

The Beechcraft Company of Wichita, Kansas, will soon have two new models on the market. They will be very similar to the present Beechcraft except that they will have retractable landing gears, including tail wheel, and different engines. One of the new ships will contain a 225 horse-power engine and will have a cruising speed of between 145 and 155 m.p.h. It will also have a wing span of 32 feet and an overall length of 24 feet, 5½ inches.



The new General G.A.-38, eighteen passenger tri-motor transport that is now under construction

The new Lockheed Orion 10 passenger transport. It cruises at 205 miles per hour

The other ship will have one of the new double row fourteen cylinder Wright engines, giving the plane a cruising speed of 225 m.p.h.! This Beechcraft will be the fastest transport in the world.

The present Beechcraft of 420 h.p., has been equipped with one of the new Watter tunnel cowls. The new cowl, which almost completely encloses the engine except for small openings in front and rear, adds considerably to the beauty and performance of the ship.

Similar cowls are also being tested on two standard Vought Corsairs in the Republic of Mexico.

Though the Beechcraft concern sold only two planes last year, their first year of operation, they have received an order from a certain eastern concern for a fleet of the new models. Further details of the project have not been made known.

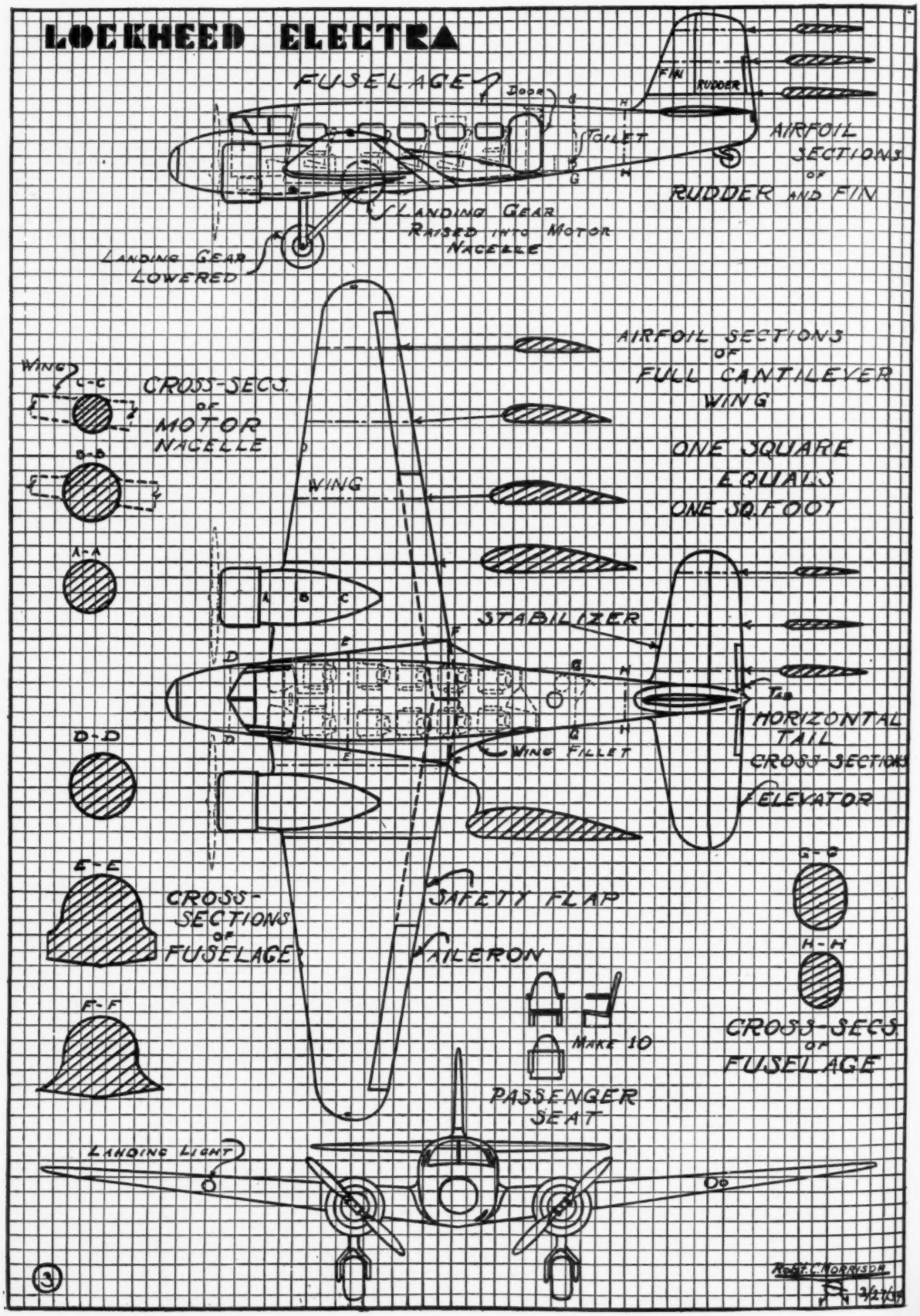
The Davis Aircraft Corp. of Richmond, Ind., has introduced an excellent little high-wing monoplane known as the D1-W. The power plant is a Warner Scarab, affording a cruising speed of well over 120 m.p.h., according to Walter C. Davis, president. A movable enclosure covers both cockpits of the two-place plane.

A certain Mexican aviator has ordered a plane for a trans-oceanic flight from an aircraft company in Inglewood, California, which probably means another new Northrop similar to Frank Hawks' or Lincoln Ellsworth's ill-fated ship.

Among foreign planes of note are the exceptional Fokker F.XX tri-engined transport and the new Savoia-Marchetti S-80 amphibian. It will be interesting to note that the Fokker craft carries three American Wright Cyclones of 640 h.p. each. These planes are two of the first attempts of foreign countries to equal the performances of our present planes.

Our aeronautical engineers have made great strides, unsurpassed by any other country, in the development of the airplane in the past two years, and it is pathetic to think that the majority

(Continued on page 13)


LOCKHEED ELECTRA
FUSELAGE
DOOR
TOILET
FIN
RUDDER
AIRFOIL SECTIONS OF RUDDER AND FIN
LANDING GEAR RAISED INTO MOTOR NACELLE
LANDING GEAR LOWERED
AIRFOIL SECTIONS OF FULL CANTILEVER WING
ONE SQUARE EQUALS ONE SQ. FOOT
WING
C-C
CROSS-SECS. OF MOTOR NACELLE
B-B
A-A
WING
STABILIZER
HORIZONTAL TAIL CROSS-SECTION
ELEVATOR
WING FILLET
D-D
E-E
CROSS-SECTIONS OF FUSELAGE
F-F
SAFETY FLAP
AILERON
G-G
H-H
CROSS-SECS OF FUSELAGE
MAKE 10
PASSENGER SEAT
LANDING LIGHT
R. F. C. NORRISON
3/27/34

of the general American public scarcely realizes the fact.

Great Britain has developed a new fighter, the Gloster Gauntlet. An official speed of 216 m.p.h. has been attained with a 650 h.p. engine.

The Bellanca people have announced their new 1934 models. They are similar to former Bellanca ships but with many refinements, such as wing fillets and other improved streamlining.

The great activity of the Wright Aeronautical stock on the New York Stock Exchange, the jumping of the stock from a low of $16.50 to a high of $75.00 in one month (January, 1934), has caused much curiosity. The sudden rise is probably explained by the announcement that the government will purchase over a thousand new planes for the Army Air Corps, and it is highly probable that the Wright Aeronautical Corporation will supply the bulk of the engines to be used in the planes. The announcement of the large aircraft order may result in the development of many more fighting plane designs.

At present many companies are secretly developing new fighting craft, too numerous to include in these pages. Therefore, we will devote the forthcoming article of "On the Frontiers of Aviation" exclusively to military aviation, giving plans and descriptive matter of the latest planes of our government.

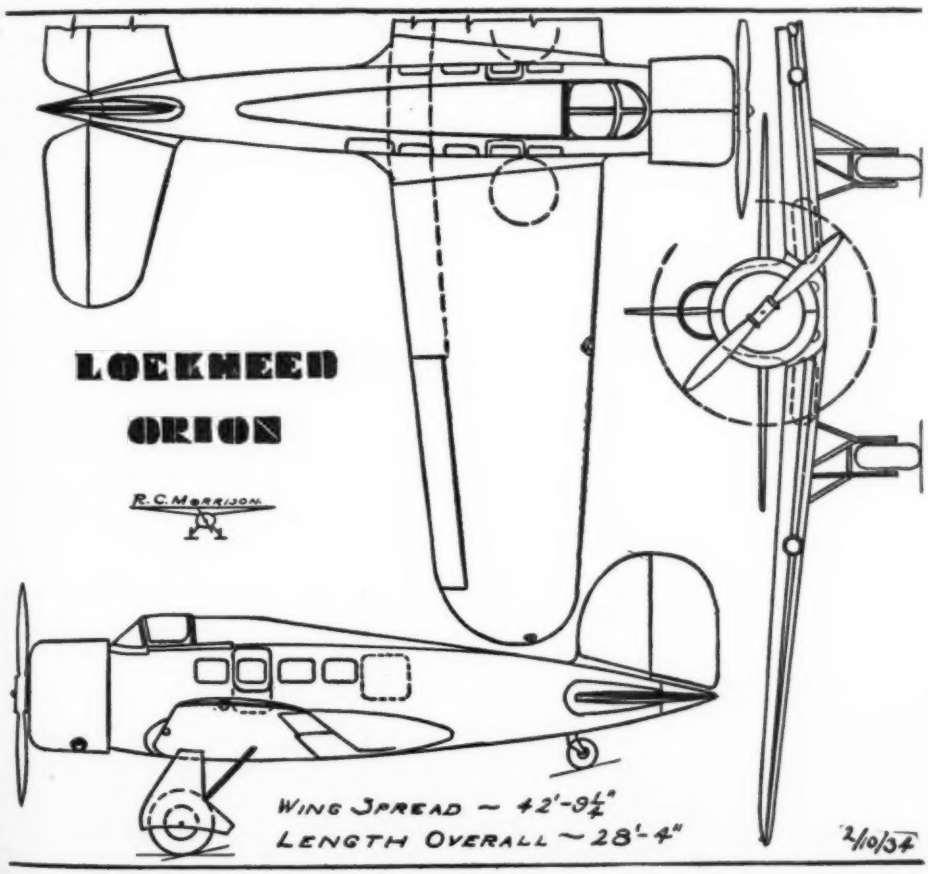
The Army Air Corps, under joint cooperation with the National Geographic Society, is having a huge stratosphere balloon made at the Goodyear Zeppelin Company at Akron. It will be the largest free balloon ever made and is expected to break the world's altitude record by many miles. Captain Stevens, famous Air Corps photographer, will pilot the balloon, accompanied by Major William Kepner.

The giant zeppelin being built in Germany, is nearing completion. It will be considerably larger than our Macon and will be fitted for trans-Atlantic passenger service. The dirigible will offer stiff competition against Pan-American's six new thirty-two passenger flying boats.

The returns from the questionnaire sent out by the Department of Commerce for Aeronautics, for the purpose of finding out if there is a demand for a $700.00 sport plane, have been so encouraging that the department is going ahead with plans for developing such a plane. The low price will be made possible by producing the plane on a mass production basis by some formidable aircraft concern.

Prof. Klemin, head of New York University's aeronautical engineering department and author of several articles in UNIVERSAL MODEL AIRPLANE NEWS, has designed a plane which he thinks would be the ideal $700.00 plane. The ship is of similar design to the Kinner Play Boy and the Northrop Beta. It is a two-place, side-by-side low-wing monoplane capable of a speed of 108 miles per hour and a landing speed of 40 m.p.h. with flaps down.

The B/J OJ-2 from which the mail plane has been developed



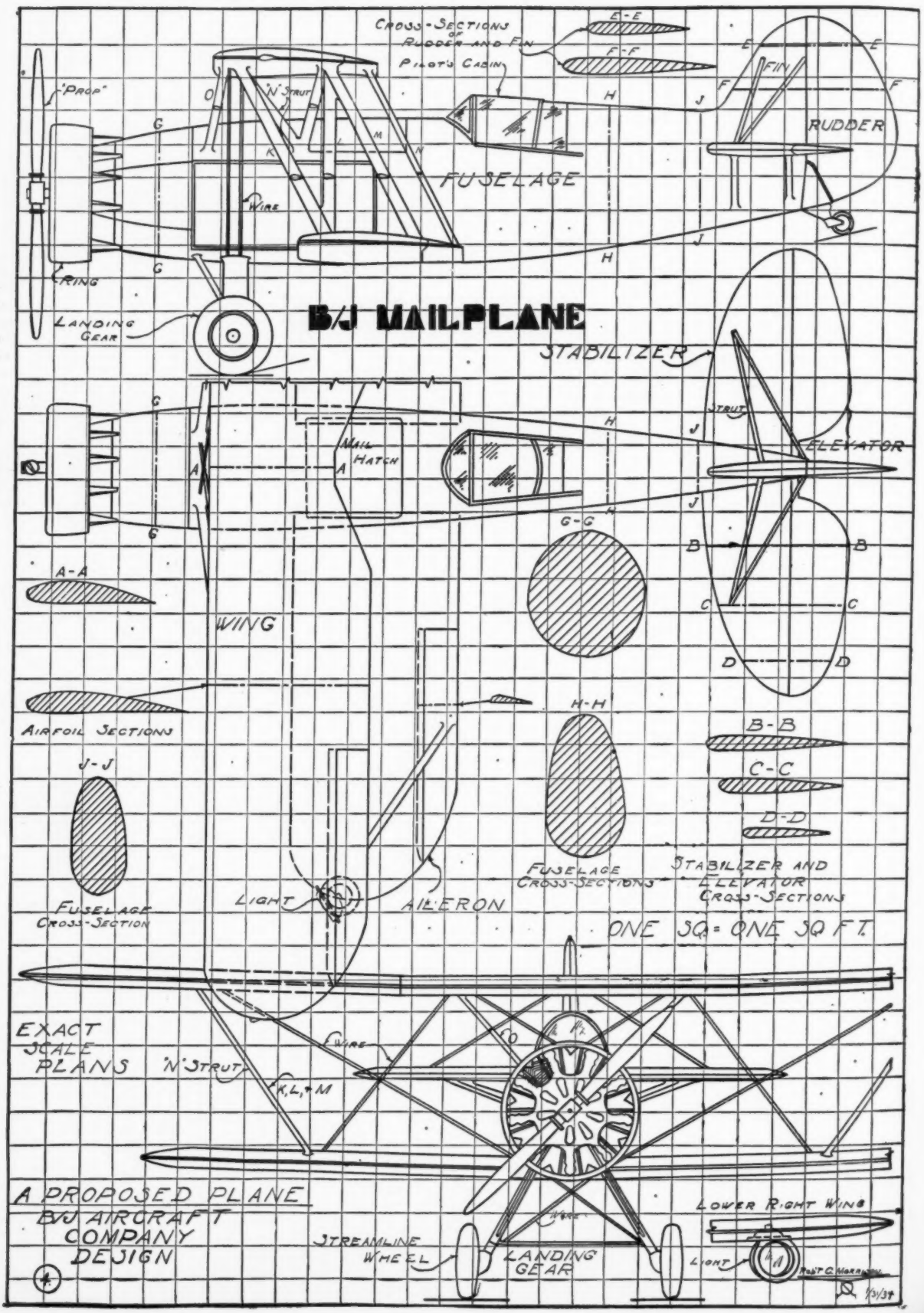
Northwest Airways will be one of the greatest users of Lockheed aircraft in 1934. They have ordered a fleet of both the Lockheed Orions and Electras for use on their service between Spokane and Chicago. The twin-engined Electra will be used for the day service and the Orions will be used at night, carrying both mail and passengers.

Radical changes have been made in the 1934 Lockheed Orion. The design of the entire fuselage has been changed. A larger and longer turtle deck has been built in back of the single pilot cockpit to insure better streamlining. Large wing fillets have been employed as well as wing flaps, two features that will be found on nearly all high speed aircraft of 1934. The horizontal tail surfaces have also been redesigned.

The performance of the Orion 9-D is as follows:

Type ..... 7 PCLM
Make of engine P&W Wasp
H.P. at rated r.p.m. at rated altitude 550, 2200 at 5000'
Propeller ..... Smith

(Continued on page 34)


B/J MAILPLANE
CROSS-SECTIONS OF RUDDER AND FIN
PILOT'S CABIN
E-E
F-F
FIN
RUDDER
FUSELAGE
"PROP"
"N" STRUT
WIRE
RING
LANDING GEAR
STABILIZER
STRUT
ELEVATOR
MAIL HATCH
G-G
A-A
WING
AIRFOIL SECTIONS
J-J
FUSELAGE CROSS-SECTION
LIGHT
AILERON
H-H
FUSELAGE CROSS-SECTIONS
B-B
C-C
D-D
STABILIZER AND ELEVATOR CROSS-SECTIONS
ONE SQ = ONE SQ FT.
EXACT SCALE PLANS
"N" STRUT
K, L, & M
WIRE
A PROPOSED PLANE
BJ AIRCRAFT COMPANY
DESIGN
STREAMLINE WHEEL
LANDING GEAR
LOWER RIGHT WING
LIGHT
Robt C. Harris
7/31/34

Build the Kawasaki Fighter

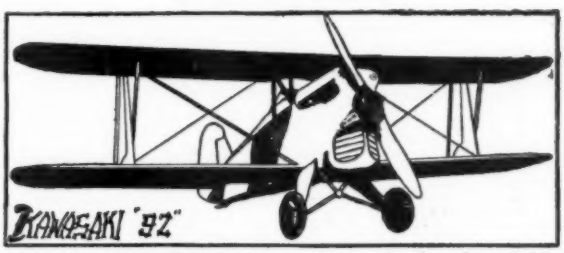
How You Can Build a Flying Scale Model of the Latest Japanese Fighting Plane. Information Direct from Japan Made These Plans Possible

By ELMER PILZER

JAPAN has shown startling advancement as a result of the Shanghai and Manchukuo fracas, and the far-sighted Nippon is now going in for all-metal construction. The plans to follow show you how to build one of their latest all-metal jobs.

At first glance you may mistake this airplane for the old Curtiss Hawk P-6, but upon closer examination you will notice the different and unusual single bay strut, the different landing gear and lastly the wings of equal span.

This Kawasaki KDK-5 type "92" is a single seat pursuit ship, powered with a 600 h.p. B.M.W. water-cooled engine, which is somewhat similar to the old Curtiss "Conqueror."



How your model will look when made from the first plans of this ship to be published in America; given here

The special type outer bay strut gives an equal bracing support to the "Vee" and "N" struts, the latter of which is used on most modern fighting ships. Behind this strut is an aileron strut, which connects both ailerons that are on the upper and lower wings.

As for speed, this ship is well up in the 200 m.p.h. class, which all together makes a pretty formidable foe to be up against.

In order to produce a perfect flying scale model, it is advisable to work directly on top of the plans and to follow instructions closely.

Fuselage

Before starting to build, obtain a soft smooth board to work on, a sheet of carbon paper and transparent wax paper.

Join drawings No. 1 and 3 together and pin on board. Now pin wax paper over the drawings and start by making both sides of the fuselage. This is indicated by the very heavy lines. After letting these sides dry thoroughly, trace the formers on 1/16" sheet balsa.

All the tracing is done with carbon paper, then, according to the top view of the fuselage, cement in place all the formers, putting 1/16" sq. balsa on bottom of body. Now cement in place the stringers, and sandpaper the entire frame.

Wings

Start by tracing all ribs on 1/16" sheet basis. If desired, the lightning holes may be left out, but in order to reduce unnecessary weight it would be advisable to go to the trouble of cutting out the holes. On drawing No. 2, you will find plans for making an upper and lower left wing. In order to make the upper and lower right wing, you may either draw it or trace it on another piece of transparent paper, and turn the paper over so the drawing is on the underside. It will then show through the paper as a right hand wing.

First pin down the rear spar and the leading and trailing edges. Now cement on a steamed piece of 1/32"x1/16" bamboo, for the wing tips. Then continue by cementing in all the ribs in their respective places, and finally the upper leading spar. Make the center section likewise. Let these surfaces dry on board overnight so as to prevent warping. When that is done, cement the upper left and right wings on to the center section, giving them a ¼" dihedral at both tips. When dry, sandpaper both wings.

Tail Surfaces

In order to increase the strength of the stabilizer, a piece of 1/16" sq. bamboo is put across it. Then with the aid of pins, carefully bend a piece of 1/32"x1/16" steamed bamboo halfway around the tail. Round off a piece of 1/16"x⅛" balsa for the leading edges and finally cement in the rest of the braces which are all of 1/16" sq. balsa. Make the rudder according to plan, and after both surfaces are left on the board to dry overnight, sandpaper them.

Nose Block and Propeller

These are the parts which prove your model building abilities.

The nose block "B" is first shaped according to the side view, then the top view, and finally the front view. It is then cut in half from the top down and gouged or cut out until the walls are 1/16" in thickness all around. Now re-cement both parts together again.

Radiator block "C" and block "D" are done in the same manner and cemented in place on bottom of block "B." Block "A" is cut from ⅛" sheet balsa and an eyelet is cemented in the center of it.

The propeller is the heart of the airplane; therefore, utmost care should be taken in carving it out. Make a template of thin cardboard of half the front view. Trace that around on both ends of the block. Now cut away the lined section according to drawing No. 1. Do the same for the side view, and finally cut out the shape and twist of the blades, and sandpaper it. Do not forget to balance the prop after it is finished, so as to elimina'e vibration.

Make the motor stick according to plan and put the wire prop shaft through the prop hanger, put on washers, then through the prop hub, and finally bend back and cement the small cone on front of the hub.

Study the plans closely and you'll get the whole arrangement of the motor stick.

Struts and Assembly

Cut out and streamline all the struts. Cut notches on the nose block and cement in place. When dry, cement on the landing gear and center section struts. Now cement the whole top wing on the center section struts. Using banana oil for adhesive, cover every part that requires covering. When finished, cement both tail surfaces in place, being careful to line them up correctly.

You may now put on the lower wings and outer bay struts. After everything is thoroughly dry, you may put in all the scale effects, such as celluloid windshield, flying wires, reed pipe exhausts, lines for the radiator and big red circles for the insignia. The insignia are put on the top of the upper wing, the bottom of the lower wing and the sides of the fuselage.

The motor stick is now inserted in place (do not cement in), after being powered with four strands of ⅛" flat rubber, and the model is now ready to fly.

If you have made this model accurately according to the plans and instructions, there is no reason whatsoever why it will not take off and land perfectly after a beautiful long flight.

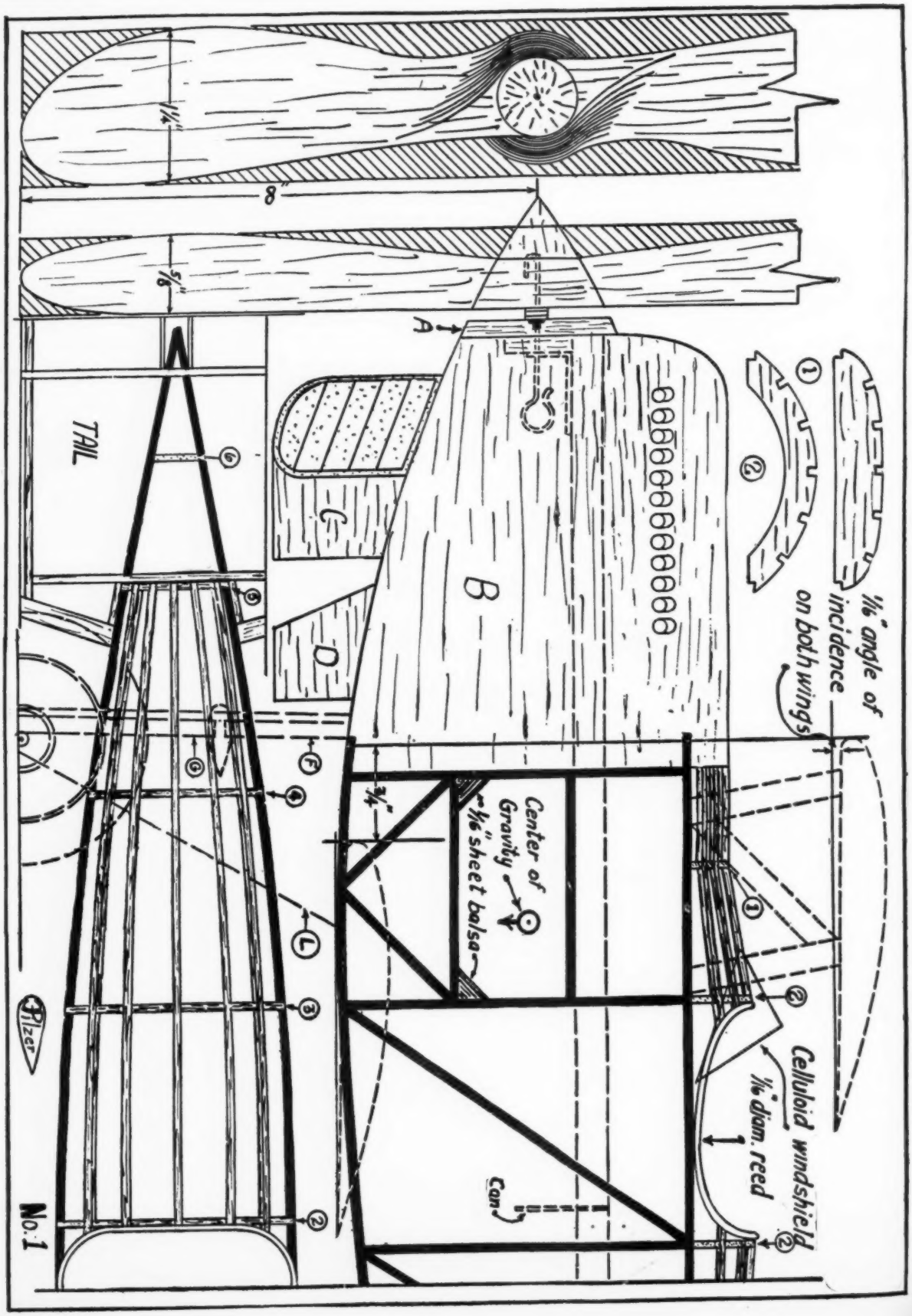
In order to have the model fly properly, add weight to the tail or nose as required in order to make it balance at the point marked (C.G.) on the side view of the fuselage plans. Doing this may save the model from a disastrous crack up. Minor adjustments may be made after a few flights, which will give you perfect balance in flight. Add to or take away a little more weight from the nose of the ship as may be required in such an event.

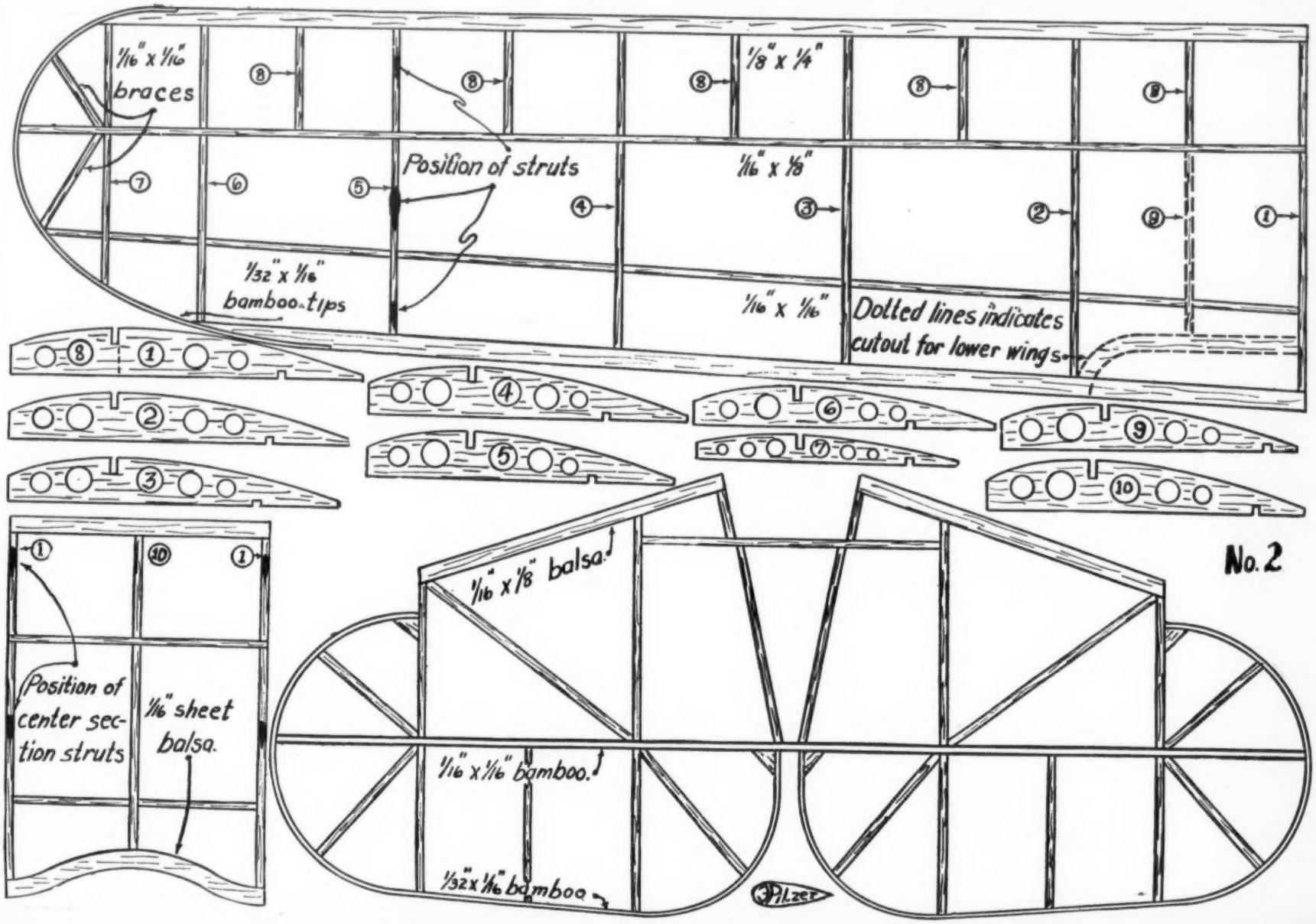
Flying

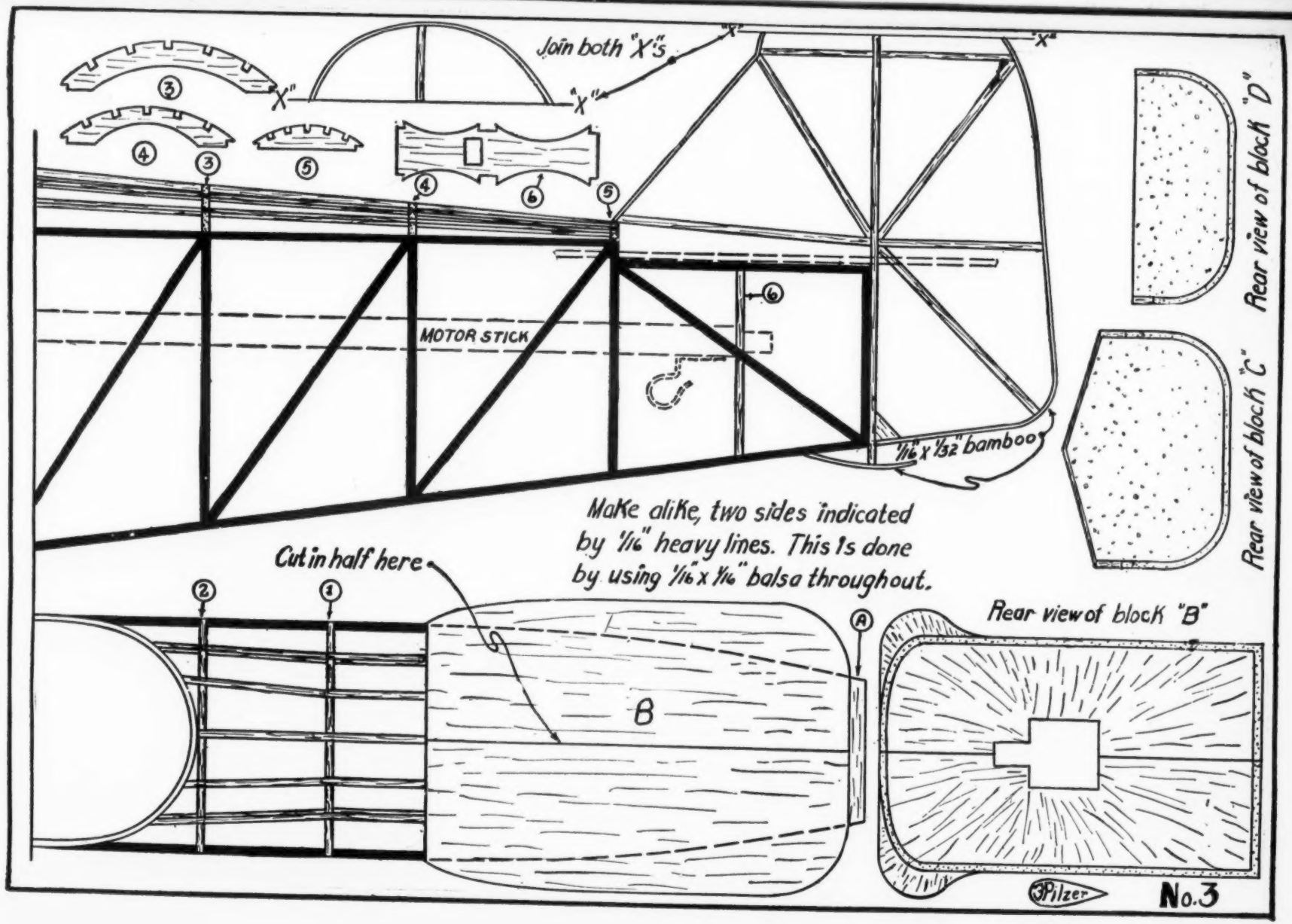
If in flight, the model dives, warp up the elevators slightly, but if it stalls, then warp them down.

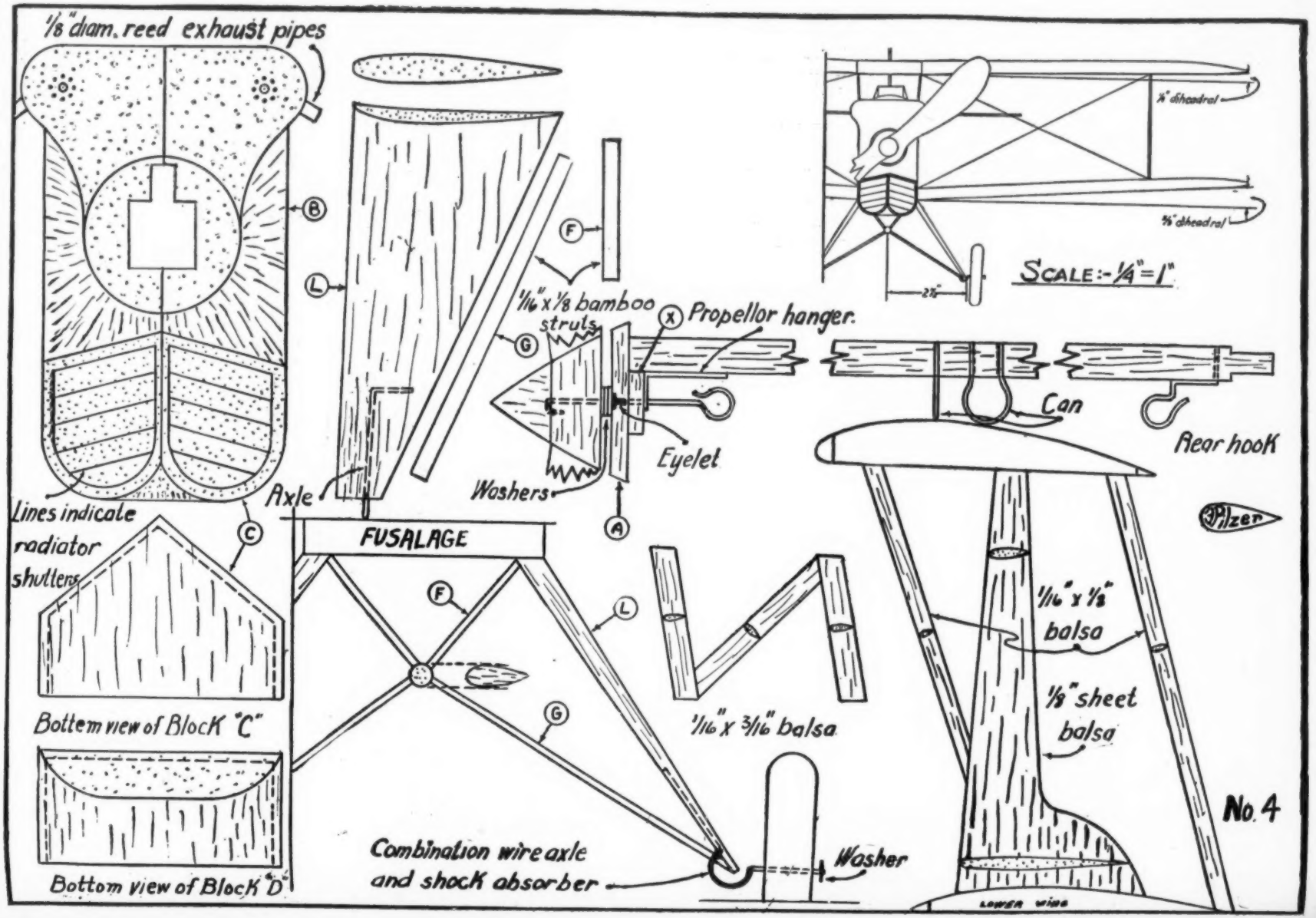
Due to propeller torque, the model may tend to twist around on the line of thrust. There are a few ways to prevent this action. One is to warp the elevators, one up, and the other down, in the same manner as ailerons. Another way is to put a small weight on the end of the wing which goes up during flight. But the best way is to set the fin slightly over towards the wing which drops in flight, or give the wings a little more angle of incidence on the same side.

If, however, you have any difficulty in flying the model, kindly write to the editor in care of this magazine, and all your flying troubles will be gladly smoothed out.


1¼"
8"
⅝"
A
B
C
D
TAIL
⅛" angle of incidence on both wings
Celluloid windshield
⅛" diam. reed
Center of Gravity
⅛" sheet balsa
¾"
Can
Pilzer
No. 1


1/16" x 1/16" braces
1/8" x 1/4"
Position of struts
1/16" x 1/8"
1/32" x 1/16" bamboo tips
1/16" x 1/16"
Dotted lines indicates cutout for lower wings
Position of center section struts
1/16" sheet balsa.
1/16" x 1/8" balsa.
1/16" x 1/16" bamboo.
1/32" x 1/16" bamboo
No. 2


Join both "X"s
"X"
"X"
"X"
MOTOR STICK
1/16" x 1/32" bamboo
Rear view of block "D"
Rear view of block "C"
Make alike, two sides indicated by 1/16" heavy lines. This is done by using 1/16" x 1/16" balsa throughout.
Cut in half here
B
Rear view of block "B"
Pilzer
No. 3

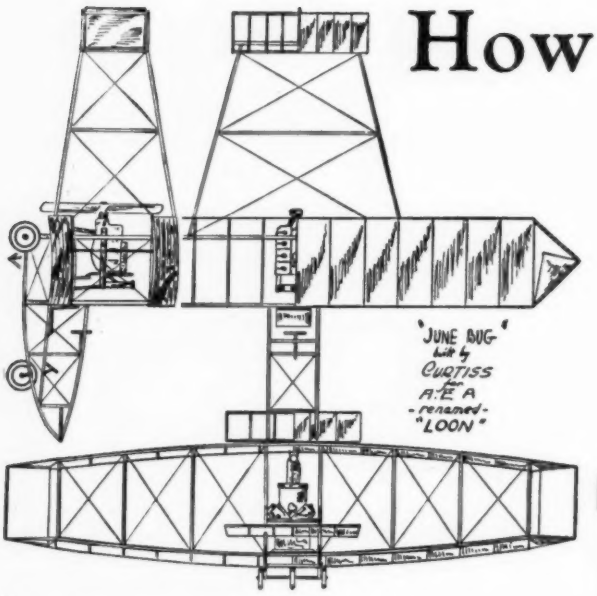

1/8" diam. reed exhaust pipes
B
L
F
1/16" x 1/8 bamboo struts
G
X
Propellor hanger.
Can
Rear hook
Eyelet
Washers
A
Axle
FUSALAGE
Lines indicate radiator shutters
C
Bottom view of Block "C"
Bottom view of Block "D"
1/16" x 3/16" balsa
1/16" x 1/8" balsa
1/8" sheet balsa
Combination wire axle and shock absorber
Washer
SCALE:- 1/4" = 1"
No. 4

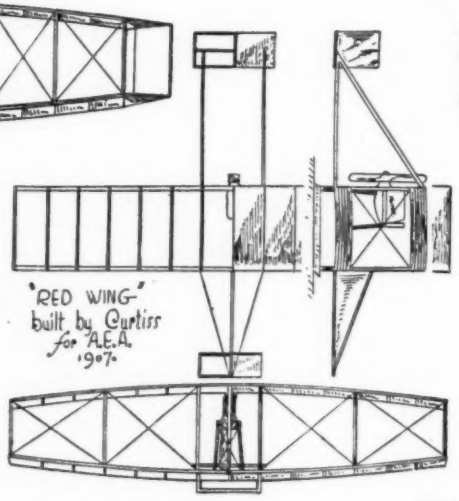
How the Aeroplane Was Created

How Glenn H. Curtiss Established the Airplane As a Practical Vehicle of the Air

By DAVID COOPER

PART NO. 5





IT WAS quite in keeping with the natural trend of events that as soon as the Wright brothers had shown the way to the world there would have been many followers in the newly developed field of flying. Many there were, both in this country and in Europe, especially France where Bleriot, Farman, Voisin, Santos-Dumont and others were carrying on in their historic efforts which were slowly but surely bearing fruit.

Most of these inventors and experimenters were at their labors at about the same time that the Wright brothers were carrying on their experiments, as we shall note a little later on. Meanwhile, we shall follow the works of a very important American inventor and note just how he left his imprint on the pages of American aviation history.

Glenn Hammond Curtiss, who was born in Hammondsport, New York, May 21st, 1878, displayed a keen penchant for mechanics while still in his early youth and his various experiments and "inventions" were a constant source of wonderment to his fellow townsmen.

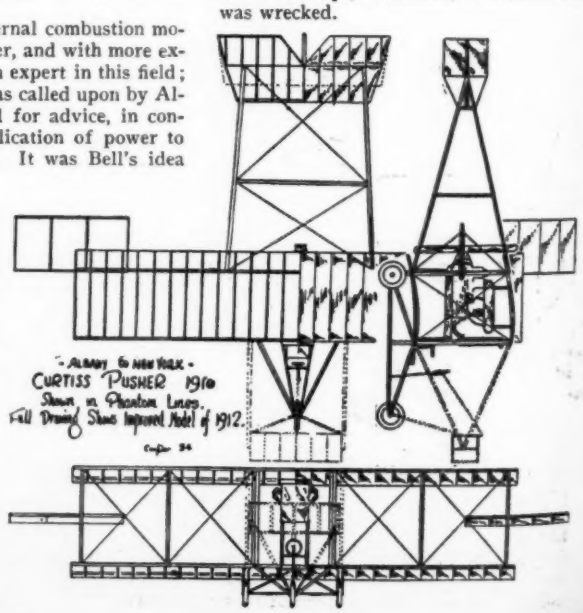
Being a speed enthusiast, he took a deep interest in bicycle racing in which sport he won several titles, but his bend for business drew him into manufacturing bicycles. One day, at the idle suggestion of the "Old Sage," of which every small village can boast at least one, he decided to try adapting an old gasoline motor to his bicycle. This motor was one with which he had tinkered during off hours at his shop. To be sure, it reared and bucked in bronco fashion, but Curtiss after arduous application soon had that smoothed out and was seen dashing madly about the countryside kicking up much dust, to the dismay of the villagers.

More improvement in his motorcycles and he soon was winning races here and there over the country, and at Daytona Beach, Fla., in 1902, he established a then world's record for speed. He later adapted two of his motors in tandem to a propeller and constructed a wind wagon. Adding a crude form of wing to ease him over the bumps, he became interested in getting his wagon off the earth, but by this time he had spent all of his own money and that which he could borrow from relatives and friends, and nearly lost all of his friends.

His interest in internal combustion motors continued however, and with more experience he became an expert in this field; so much so, that he was called upon by Alexander Graham Bell for advice, in connection with the application of power to his tetrahedral kites. It was Bell's idea that a much greater area of supporting surface was to be had with this type of cell than with flat plane surface. In furtherance of this idea, Curtiss was invited to visit Bell's home in Canada to discuss the matter.

There, he met F. W. Baldwin and J. A. D. McCurdy who both became famous pilots and Lieut. Thos. Selfridge, later killed in the crash of the Wright machine at Ft. Meyer. During the course of the discussions, Mr. Bell suggested that they organize as a group and work along systematized lines. This was greeted with enthusiasm and forthwith the American Experiment Association was formed, with Bell as chairman and Curtiss as chief power consultant, in charge of construction. The others were to be in the capacity of advisors and designers.

By the aid of Mrs. Bell who financed the company, their first co-ordinated ideas rapidly took form and on March 12th, 1908, their first effort the "Red Wing," a cellular type biplane, suggested by Lieut. Selfridge and powered with a motor of Curtiss' own design and construction, stood ready for test on the ice of Lake Keuka near Hammondsport. It was piloted by Baldwin and after a run of about two hundred and fifty feet on the ice, it rose to an altitude of six to eight feet and flew rapidly for a distance of three hundred and nineteen feet before alighting. On a second attempt, it skidded, overturned and was wrecked.



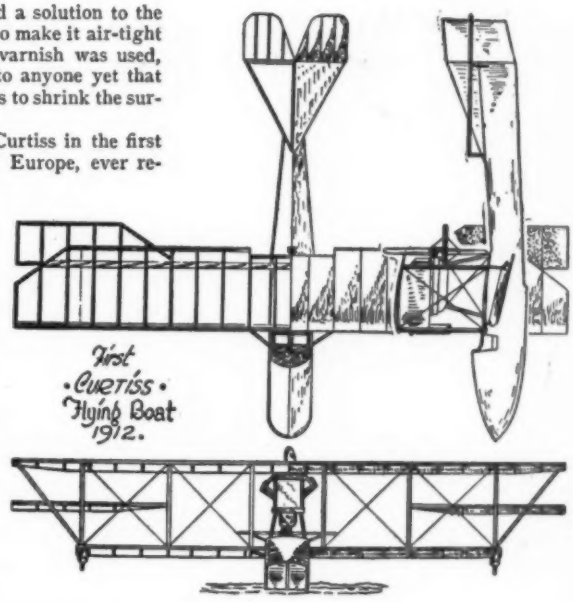
Exulting at even this partial success, the company immediately started on another improved machine and in two months, the "White Wing" was completed and ready for flight. It was larger in size and for stability, was equipped with torsional wing tips, in effect the forerunner of the present aileron. This idea and adaptation was the cause of the long drawn out litigation with the Wrights. The A. E. A. advanced the claim that although its effect was about the same, the method of application and operation was different. After much wrangling, the Wrights won out in court, but notwithstanding this the aileron came into universal usage, since it allowed for better and stronger construction of the wing mechanism.

On May 22nd, 1908, Curtiss flew the "White Wing" a distance of one thousand and seventeen feet in a straight course. Seeing further improvement necessary, the company commenced work on another machine. Their third venture, the "June Bug," was a new departure in design, with a box kite tail cell, maintaining, however, the elevator surface in front on outriggers. Incidentally, it was at this period that Curtiss first applied a solution to the cambric wing covering to make it air-tight for support. Ordinary varnish was used, as it had not occurred to anyone yet that it might be advantageous to shrink the surfaces drum tight.

On July 4th, 1908, Curtiss in the first public flight outside of Europe, ever recorded officially, flew the "June Bug" slightly over two thousand yards at a speed of thirty-nine miles an hour to win the first leg on the trophy awarded by the Scientific American magazine.

Later that year, Curtiss attached floats to the undercarriage of the "June Bug" now renamed the "Loon" and attempted to fly it from the waters of Lake Keuka. After many unsuc-

(Cont. on page 36)



The Eastern States Outdoor Contest

Sanctioned by the National Aeronautic Association

Sponsored by Universal Model Airplane News and the Bamberger Aero Club, Newark, N. J.

GREAT events in the model airplane field are about to take place. Everyone unquestionably is looking forward to the Annual National Competition which is to be held at Akron, Ohio, June 27th, to 29th. However, another great contest is to be held for all model fliers of the Eastern States on Saturday, May 19th, at Newark Airport.

This contest will serve two purposes. First, it will act as an elimination contest for the National Competition to be held at Akron. Second, it will provide an opportunity for the model builders of the Eastern States to show their "latest stuff." Many builders that we know have been waiting with "bated breath" for a chance to display their art in gas engine model design. If we are to judge from indications, there will be the greatest display of gas engine models at this contest in the history of the world.

The events of the contest are as follows:
Fuselage Endurance (weight rule).
Stick Model Endurance (weight rule).
Gasoline Engine Powered Models Endurance

Prizes

Some very unusual prizes are to be offered. The high point winner of a contest will be given a free trip to the National Competition at Akron. High point winner of the Bamberger Aero Club will also be given a free trip to the National Competition. If he is also the high point winner of all the contestants, the second high point winner of the Bamberger Aero Club will be awarded the free trip. Those who win first place in each event will be awarded a large trophy. Second place winners in each event will be awarded a small trophy. Winners of third, fourth, fifth and sixth places in each event shall be awarded a gold medal.

We are sure that those eligible to enter this contest will receive this news with great joy.

L. Bamberger & Co. and Universal Model Airplane News have joined forces to make this the greatest contest ever staged in the vicinity of New York. Members of the Bamberger Aero Club, in fact, are working "tooth and nail" on their latest ships in order to run away with the prizes. Contestants had better take warning. Those who are wise enough to attend this meet will see the latest developments in fuselage, stick and gasoline engine planes. If you want some real excitement don't fail to be on hand for this stirring event.

All contestants should be at Newark Airport with their ships at 9 A. M. If the weather makes it impossible to hold the contest on this day, it will be postponed to the following day, Sunday. In the event that Sunday also is unsuitable for flying the contest will be held on May 26. Other details of value and interest will appear in the June issue of Universal Model Airplane News. In the meantime, sweep the cobwebs off your workbench and get busy. This contest will be held under the official rules of the National Aeronatuic Association and all records will be certified. Following are the rules which will govern the contest.

Rules

All contestants must be under 21 years of age. There will be no senior and junior class.

Each contestant shall be the owner, builder and operator of the competing models. However, the design may be obtained from any source. All parts except thrust washers must be built by the contestant.

No part of a model may be dropped in flight. Models must be powered with rubber strands.

Each contestant will be allowed, in each event, three official flights. He will be credited with the greatest elapsed time made in any one of his three flights. A contestant is allowed a total of three models in each contest.

A flight is a start which lasts for 30 seconds or longer. Any flight under that or failure to fly in turn promptly when summoned, is a delayed flight. Three successive delayed flights will be considered as an official flight.

Any contestant breaking the contest rules or conducting himself contrary to the ordinary requirements of common courtesy, may be disqualified. Models are not disqualified if broken in landing after an official flight.

Flight time begins the instant a model is in full flight and ends when the model first touches the ground or meets any object preventing further flight within ten seconds. However, if a model meets an obstruction and falls free independently and resumes flight within ten seconds, time shall not be interrupted.

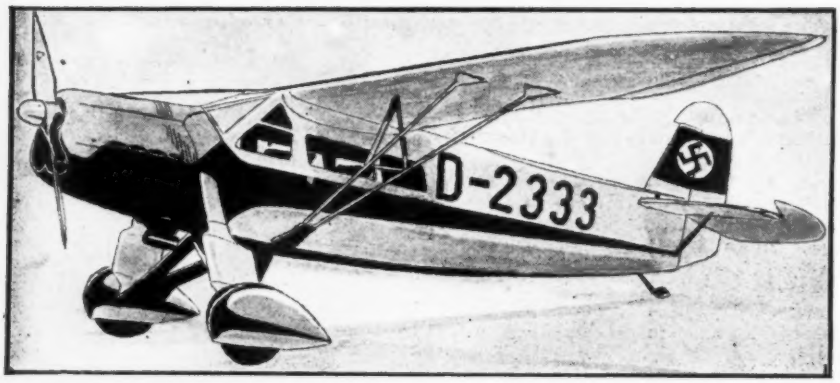
Fuselage Endurance Contest

The model must have built-up fuselage covered over at least 90% of its surface. The fuselage must have a maximum cross section area at least equal to 1/10 of the

(Continued on page 47)

Air Ways Here and There

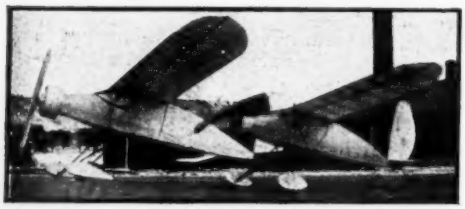
What Readers Are Doing to Increase Their Knowledge of Aviation in All Parts of the World. Send Pictures and Details of Your Experiments



The Focke-Wulf A-43 "Falke." A 3 passenger German transport

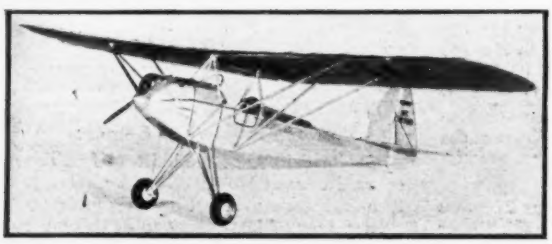
Pict. No. 1. A 6 ft. gas job, built by Ludwig Bielko, powered with a ¾ h.p. gas engine

Pict. No. 2. Alan Booton's two hydros and his model plane retriever used on his vacation in Florida



Pict. No. 3. A 2½ ft. and a 5 ft. Gordon Light Tractor by Wilbur Wormuth. The large ship has flown for 4 min. 10 sec.

Pict. No. 9. A detail scale D. H. 4 built by Wm. Powell, one of the finest yet



Pict. No. 6. A perfect scale model by Glen Courtwright

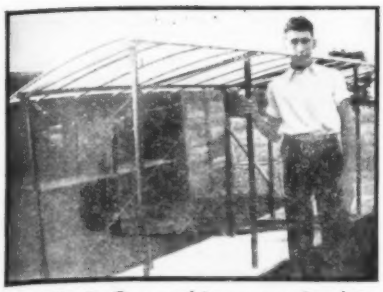
Pict. No. 5. Here is a real fleet by Charles and Fred Hermann

OUR young model builders are becoming more versatile, it seems. From the pictures in Air Ways this month you will see that they are branching out into various fields of airplane construction. Having attained success with the orthodox rubber powered flying model, recently model builders have chosen to occupy their time with something different. The gas model is a product of this urge.

In picture No. 1 we see one of the latest gas creations. It was built by Ludwig Bielko. It boasts a spread of 6' 10" and weighs 4 lbs. The frame is made up of balsa wood and hard wood where the stresses are intense. A Loutrel two cycle gas engine turns a 14" prop at about 4200 r.p.m. This ship has made some very excellent flights and is exceedingly fast. In fact, the builder intends to replace this one with a new one which will not have as much impact if it should hit the ground.

Alan D. Booton of 60½ Patton Ave., Asheville, N. C., who is one of our foremost model builders, recently took a jaunt down to Florida. This did not divorce him from his model work, however, for picture No. 2 shows the result of some time spent with his favorite hobby. The single propeller job is a Gordon Light Hydro which Booton says flies better than any hydro he has built, unless we take note of the second plane in the picture. This is a "twin" propeller job and runs a close second in performance to its brother hydro. Booton prizes these models so much that he spent two days building a model airplane retriever, which you see in the picture. He says it is extremely fast and certainly very useful. It is made of ¼" square cypress longerons, covered with 4 yards of canvas. The whole boat, with paddle, weighs less than 20 pounds and was built at a cost of $5. If anyone is interested in knowing more about this trim craft, Booton will be very glad to provide the information desired.

Gordon Light seems to be the favorite in the model world, for here are two more planes shown in picture No. 3, of Gordon Light designed ships built by Wilbur Wormuth of Cobleskill, N. Y. The small one was built from Gordon Light's plans; however, the large one was built from plans in which the measurement was doubled and minor details of construction changed. The small job has a 2½' wing spread, while the large one has a span of 5'. Wormuth says that the large job flies 70 seconds consistently, but the smaller one flies over 2 minutes. From examining the picture, we would say that the shortness of the flights of the large plane compared to the small one is due to the fact that his propeller is improperly designed, as it is a straight pitch propeller and not a helical one. Second, the pitch is extremely low and the propeller unwinds quickly. By increasing its pitch and blade area in proportion, also the diameter if possible,



Pict. No. 7. Our models are growing into gliders. Here is one built by Charles Tracy, Bill Billings and Ed Hansen. It has a 14' wing spread

Pict. No. 10. Welcome Bender, Lt. Aldworth and Casey Jones service the Bamberger Aero Club's Curtiss Junior gas model for a flight at Newark Airport. A Brown Jr. engine is used

Pict. No. 11. The Bamberger Curtiss Jr. gas job takes the air bumps

much longer flights may be obtained. Of course this change would involve adding more rubber to the motor and putting a greater strain upon the structure. This may not be necessary, however, for Wormuth tells us that on a flight during which the propeller stopped at 25 seconds' duration, the ship kept on gliding and did not come to the ground until a duration of 4 minutes 10 seconds had been made. This large plane weighs 12 oz. and is driven with 60' of ⅛" flat rubber.

Thomas J. Clyburn, of 152 W. Center St., Akron, Ohio, has been busy in the lighter-than-air department of aviation. In picture No. 4 you will see a model of the U. S. S. Macon which he has very carefully constructed. It is exceedingly complete and even boasts of a movable mooring mast which is equipped with tractors. This you can see from the photograph. The weight of the dirigible is only 1½ oz. and it is 18½" long. It is not surprising to hear that this ship took first prize in a model aviation contest last summer. Further information may be obtained by writing to the builder.

The Hermann brothers, Charles and Fred, of 3576 De Kalb Ave., Bronx, New York, are exceedingly air-minded. In picture No. 5 is a group of scale models very neatly built by them. These ships range in wing span from 5" to 54". There are fourteen in all. The Boeing Bomber and the Friedrichshafen Bomber have exceptional flying qualities. Nine of these planes were built from plans appearing in Universal Model Airplane News. These young men deserve a lot of credit for their work.

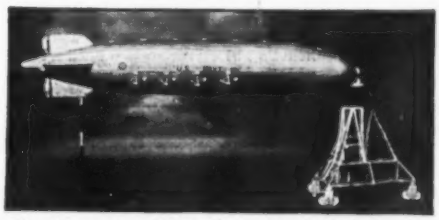
Glen Courtwright of 222 College St., Lincoln, Ill., does exceptionally fine work so that we feel obliged to show one of his latest creations. It is a Heath, built to ¾" scale and is shown in picture No. 6. Courtwright deserves the proverbial "furlined bathtub" for this contribution. We rank it as one of the best of the month.

It seems that Charles Tracy of 142 Robert Ave., Bellevue, Ohio, has wandered from the normal path of model building and has tried his hand at building a glider with the help of two pals, Bill Billings and Ed Hansen. It is shown in picture No. 7. Tracy is standing close to his brain child. The ship has a span of 14' and a chord of 3' 9". Its overall length is 10'. The gap between the wings is 4'. The framework was screwed and bolted together and covered with muslin. One hundred twenty-five feet of No. 16 piano wire was used to brace it, the wire being adjustable by the insertion of twelve turnbuckles in proper places. Evidently it did not fly as well as he had hoped, for he says, "It might have been a big success had we doped the wings sufficiently. As it was, with so little span and almost undoped wings, there was very little lift. We made a mistake by allowing a smaller and lighter fellow, who knew nothing about it, try to fly it. The result was a smashed tail, many strained wires and a frightened boy. After that we brought it home and stored it in Bill Billings' garage, where it is still waiting to be repaired."

Pict. No. 14. Australia holds an indoor contest. Here are some of the experts watching the flights

Pict. No. 12. The Bamberger Aero Club's gas job No. 2. It has flown for 13 min., reaching an altitude of 2000 ft.

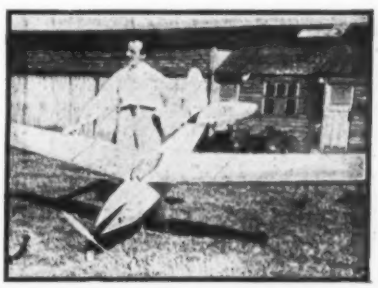
As your editor has had some experience in building gliders, he will venture to make a suggestion. He built a glider of this type in 1911 and flew it very successfully. Judging from his experience, he believes that the span of this machine is very much too small and the camber of the wings not great enough to insure a slow flying speed. The wings may be easily doped by dissolving 2 pounds of melted parawax in 1 gallon of gasoline and applying the mixture to the muslin with a brush. This will not only make the surface air-tight, but will make it absolutely waterproof. We will wait with bated breath to hear about further trials of this ship.



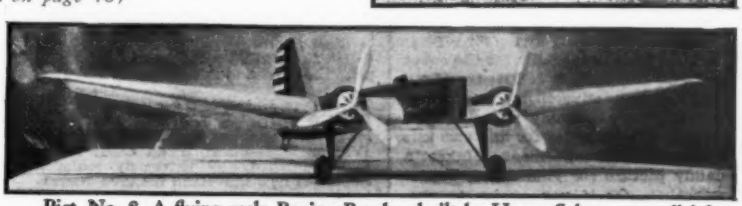
Pict. No. 4. An 18⅛ inch model of the "Macon", by Thomas Clyburn. It is built in careful detail

Henry Scherr of 401 E. Lawton St., St. Clair, Pa., is responsible for the flying scale Boeing model shown in picture No. 8. It is a very

(Cont. on page 46)

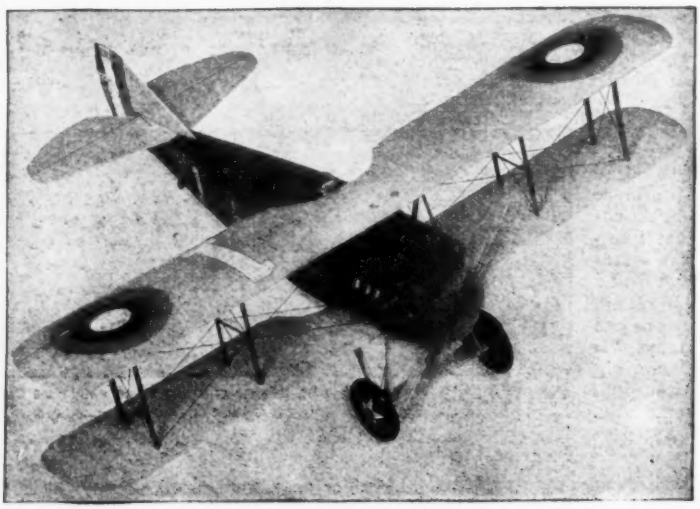


Pict. No. 13. How is this for a rubber powered model, span 12' 2"? Built by R. Galloway of England



Pict. No. 8. A flying scale Boeing Bomber built by Henry Scherr; a swell job

Whew! We thought we had a lot of customers, but you s
since we made that bombshell announcement of these sensa



Never before such buys—prices so startlingly low that th
selling through dealers! Such was a daring step, entirely
—(however, Cleveland has never hesitated to do a thing,
interests)—but since the C-D line of Kits is so extensive
display, it was decided that quicker, more satisfactory
from our own large, ever ready stock of Kits. At these
in flying model airplanes, and every model enthusiast

Every C-D model flies—every C-D Kit is complete in every
miniature of its famous prototype. If you've never built a
airplane building of the highest type, yet planned and
exceptional value—send your order today for the ones you

Redesigned S.P.A.D. XIII

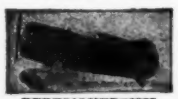
This redesigned S. P. A. D. XIII model, we believe, is far more accurate than has ever been designed anywhere before. Almost suitable for a wind tunnel test model, so precise are all its measurements and fittings which were not incorporated in our old design SF-13. Span 19¼", length 15⅝", weight 2.5 oz. Its new colors are yellow wings, tail surfaces, landing gear struts, and underneath the nose. Balance medium green.

The model bears (partly) the decoration of Col. E. V. Rickenbacker's 94th Pursuit, better known as the "Hat in the Ring" squadron with the figure "1" designating Rickenbacker's number. COMPLETE Kit SF-13B, complete with printed out wood and all parts needed, including block for scale propeller as well as flying propeller parts and balsa block for making pilot's head. ONLY..... **$1.75**

C-D

REDESIGNED 1930 HOWARD RACER

Superdetailed—yet simple enough for beginners. All white, black details. Span 15", length 13¼", weight 1.5 oz. COMPLETE KIT SF-18B (with pilot block and printed out balsa) now ONLY..... **98c**



REDESIGNED 1933 GEE-BEE

Superdetailed — Bayles' famous racer. Yellow and black. Span 17½", length 12", weight 2.1 oz. COMPLETE Kit SF-17B (with pilot block and printed out wood) now ONLY **$1.50**

1933 WACO G-8

America's keenest cabin biplane. Span 24¼", length 18⅛", weight 3.7 oz. Silver and red. COMPLETE Kit SF-37 (with pilot block and printed out wood) ONLY **$2.75**

1933 CURTISS F9C-2

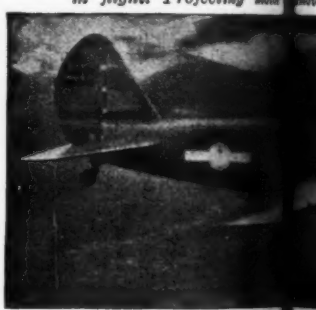
Model sensation of 1933. Keen in detail, looks and flights. Colored silver, blue and red. Span 19⅛", length 15⅛", weight 2.2 oz. COMPLETE Kit SF-22B (with pilot block and printed out wood) now ONLY **$1.75**

Remit by cash, check or money order. If cash used—insure. No C O D's. All orders promptly and carefully filled. We ship all Kits postfree—except Boeing 247 (which is shipped via express—shipping charges paid by recipient upon delivery).

WHICH I

Below are shown three pictures of the Boeing
(the one that is built and tested before an
The pictures prove two things—first, the
yet this Boeing isn't one of the most highly
and accuracy of C-D drawings which enable

This is the master Cleveland in flight. Projecting motor



This is a view of the ing 247 itself flying

This is the model, built by a model

C-D BOEING 247—¾" scale—55⅝" span—
with everything needed, shipped via express
never before sold for less than $6.50, now on

Beautiful 14"x 11" Color Picture of VOUGHT V 65

Ready for framing and hanging in your room

This very striking 4-color reproduction of the Charles Hubbell oil painting made especially for the cover of Issue No. 7 CMN & PH, is offered without any advertising, ready for framing, at absolutely no cost, upon receipt of your order for any two kits from this advertisement. Makes a dandy picture for your room, den or workshop. Or if you prefer to purchase it, we'll mail it to you postfree upon receipt of two dimes.

FREE

'Til 9-1-34

1932 BOEING P-26

Formerly the XP936. The most modern pursuit model of a low wing design. Authentically detailed to the tiniest gadget. Span 21¼", length 17⅞", weight 2.5 oz. Colored yellow and olive drab. COMPLETE Kit SF-23, with printed out wood. ONLY **$1.75**

VOUGHT CORSAIR V-65

Make either of the new 2-place Corsairs (V65 or V80)—pilots 'n' all easily made. Super detailed and extremely realistic. Embodies new Cleveland features, including new principle gray flying blade. Span 27", length 19½", weight 4.2 oz. Colored blue, yellow, red, black and silver. (7 bottles of liquids alone). COMPLETE Kit SF-41, now ONLY. **$2.95**

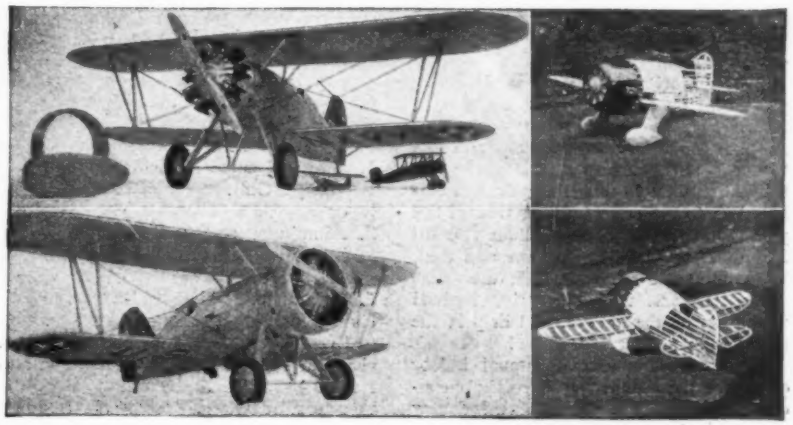
CLEVELAND MODEL S

1866N5 West 57th St. "If it's a

...ld see the avalanche of new ones that have come rushing in, ...al kits at NEW LOW PRICES on all 3/4" scale C-D models!

...t have been possible but for our discontinuing all ... the general practice of model airplane companies ... how revolutionary, if it better served modelbuilders' ... few dealers could afford to make a representative ... be given modelbuilders by having them order direct ...rices, they're the greatest values EVER OFFERED ...himself to one or more.

...ed to build the model—every C-D model is a realistic ...del—don't postpone the thrill another day—it's model ...n amazing degree. Any model Kit listed below is an ...'ll see that they reach you in a hurry.



...WHICH?

...Basing ... itself, another the master C-D model ...re ... up), and a model built from a C-D Kit, ... C-D models duplicate the prototype (and ...ible); secondly, the simplicity, thoroughness ...to easily build C-D models.

...Cleveland ... model of the Boeing 247 ...g motor ... movable for exhibition.

...ew of the ... the great Boe- ...f flying ... ...stinous country.

...the C-D Kit purchased from us. ...ished entirely silver. Complete Kit SF-35 ... express (... ...50, now only $4.95

Printed Out Wood comes with Kits: SF-1G, 13B, 17B, 18B, 22B, 23, 24, 25, 34, 36, 37, 38, 39, 40 and 41. Not just a few pieces rubber-stamped, but ALL the irregularly shaped parts printed out — as high as 16, 2x19" strips with parts carefully "jammed" on.

ALL C-D airplane kits contain drawings.

A Realistic C-D model of

1933 BOEING F4B-3

built from a C-D Kit by a N. J. Modelbuilder

This most modern airplane, which helps keep the U. S. Navy fighting forces so famous and up to the minute, is very authentically and beautifully duplicated in the master Cleveland-designed flying model with its all silver coloring except yellow top of upper wing, the all-red tail surfaces, and double V stripes on top of the wings. The sister plane F4B-4, and the one used by the Army and designated the P12E (same outlines as the F4B-3) may also be made from the kit, with the exception that the standard Kit does not contain the coloring for the Army ship, which should be yellow wings and tail surfaces and the balance olive drab.

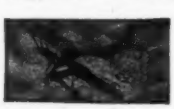
This realistic "C-D" model is capable of fairly long fast flights. Exciting to build—thrilling to fly! Boy, oh boy, What a model! Span 22½", length 15½", weight 2.2 oz. Colored silver, yellow and red. COMPLETE Kit SF-29, now ONLY. **$1.50**

Views of a partly completed **GEE-BEE SUPERSPORTSTER** built from a standard C-D Kit by a C-D enthusiast

Authentic model of Doolittle's "Super" racer. Span 18¾", length 13⅜", weight 2.7 oz. Red and white. Complete Kit SF-27, ONLY **$1.50**

1933 LINCOLN SPORTPLANE

Favorite of lightplane enthusiasts. Keen flights. Span 15", length 12⅛", weight 1 oz. Cream and black. COMPLETE KIT SF-36 (with pilot block and printed out wood) ONLY **98c**



1933 BERLINER-JOYCE P-16

America's latest two-seater Pursuit design. Span 25½", length 21", weight 3.9 oz. Yellow and olive drab. COMPLETE Kit SF-39, (with pilot block and printed out wood) ONLY **$2.75**

1918 FOKKER D-8

Quick climbs and swift flights. Span 20¾", length 14⅛", weight 2.9 oz. Blue and cream. COMPLETE KIT SF-34 (with pilot block and printed out wood) ONLY **$1.75**

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Ten full size ¾" scale drawings of such popular planes as Heath Parasol, Ma). Doolittle's 1932 Gee Bee Super-sportster, Hall Racer, French Nieuport 28, Boeing 95 Mail, English Comper Swift, Aeronca C3, Fokker D-8, Boeing F4B-3, and Monocoupe.

Forty full size ⅛" scale drawings of such dandies as Curtiss A-8 Attack, Wedell-Williams Racer, Lincoln Ellsworth Trans-Antarctic, Stout Sky Car, Curtiss NC-4, Douglas M-2 Mail Plane, Pitcairn Autogiro, Fokker Ambulance, etc., etc., etc.

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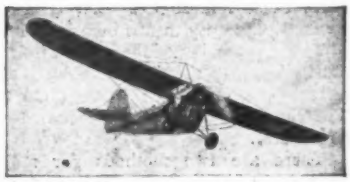

1933 Aeronca C-3 Lightplane

True in detail, beautiful in appearance, exciting in flights. THE latest model "hit!" Very easy for beginners. Span 27", length 15¼", weight 1.9 oz. Red and silver. COMPLETE Kit SF-40 (with pilot block and printed-out wood) now only **$1.75**

1933 Great Lakes Sport Trainer

Far easier to build than our older No. SF-1E and SF-1F. Excellent flights. Includes Cleveland's latest features and loads of details. Span 20", length 15⅛", weight 2.1 oz. Orange and black. COMPLETE Kit SF-1G (with pilot block and printed-out wood) now ONLY. **$1.75**

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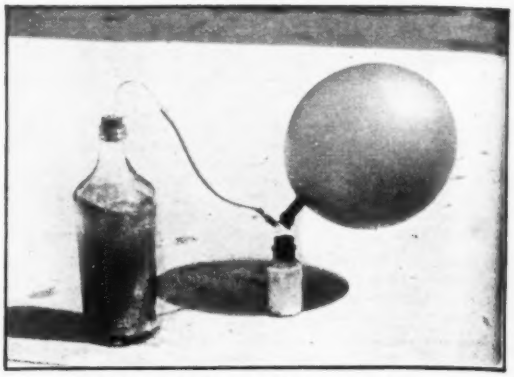
Cleveland, Ohio, U. S. A.

How You Can Make Hydrogen

A Simple Method of Inflating Model Airships and Balloons Used for Dislodging "Hung Up" Planes

By HERBERT GREENBERG



Inflating a balloon by this easy method

THE majority of indoor model aeroplane contests are held in large arenas or armories where exposed girders or rafters are numerous. Consequently, models often "get caught." Probably the best way to retrieve the plane is to use a hydrogen balloon tied to the end of a long thread. All you have to do is let the balloon rise till it is directly beneath the plane and then, by jerking the thread, knock the plane out of its place. A balsa outrigger glued to the top of the balloon will help if the model is in a difficult position.

It was at the second annual indoor contest of the Bamberger Aero Club, conducted at the 113th Regiment Infantry Armory in Newark, N. J., that the hydrogen balloon was first used. Stanley Congdon of Glen Ridge, N. J., took first place in the glider launching event with a flight of 1:09. This time was due to the use of the balloon as a launching device. The glider was attached to a small loop in the thread in such a way that the slightest jerk would release it and start it on its downward flight.

Congdon, besides using his balloon as a launching device, obliged several owners by retrieving their planes that were caught in the girders.

After seeing what could be done with a balloon, I became interested and began to do a little experimenting by myself. At the next annual Bamberger contest and every other contest held after that, I recovered planes by means of a balloon.

The preparation of the gas for inflating the balloon is fairly simple. All the apparatus needed can fit into a cigar box. The chemicals are easily purchased at a slight cost.

There are two methods for making hydrogen that are best adaptable for this purpose. They are:

1. The reaction of zinc with muriatic acid.
2. The reaction of aluminum with sodium hydroxide (lye).

The gas formed through either of these reactions contains quite a bit of moisture. As this moisure is rather heavy, we must dry the gas before it can be used by passing it through a dehydrating agent such as sulphuric acid or calcium chloride.

The apparatus used is as follows:

1. One large bottle (9"x3").
2. One small bottle (1½"x3").
3. One 1 hole rubber stopper to fit the large bottle.
4. One 2 hole rubber stopper to fit the small bottle.
5. One 7" rubber delivery tube (7/32" inside diameter).
6. 1½ feet of 7/32" diameter glass tubing.

The chemicals are:

1. Zinc and muriatic acid. (Zn+HCL).
   or
2. Aluminum and sodium hydroxide. (AL + NAOH).
3. Sulphuric acid or calcium chloride. (H_2SO_4 or Ca CL_2).

Everything may be purchased at a chemical supply house. As the zinc and lye do not have to be chemically pure, they may be obtained from other sources. For instance, zinc may be procured from any tinner or roofer or stripped from the sides of old dry cell or flashlight batteries. Lye is obtainable at any grocery store.

The first thing to do is to cut up the glass tubing into three equal lengths and bend them into the shapes shown in figure 1. If you heed the following advice, there should be no difficulty.

At the point to be cut, make a groove with the edge of a file. Push the file from you with a firm, steady stroke. Grasp the tubing in both hands, the thumbs meeting opposite the groove. Bend the ends of the tube toward you. In this way a clean cut can be made.

In bending tubing, the heat of a cooking stove gas burner is used. Hold the tubing just above the tip of the blue flame. This is the hottest part. Heat about two inches of the glass at the spot where the bend is to be made. Rotate it slowly so that its sides will be equally heated. When the glass becomes pliable, remove it from the flame and immediately bend it to the desired shape. Since the balloon must fit tightly on the tube leading from the drying bottle in order that no gas should escape, a bulb of ⅝" diameter is blown on the end of one of the pieces of tubing. This is accomplished by first heating the end of the tube in the flame until it closes up completely. Leave the same end in the flame for about a minute more, after which time withdraw the tube and blow through the opposite end until the bulb of the specified size has formed. A hole is then put in the bulb by heating the tip of it in the flame and at the same time blowing hard.

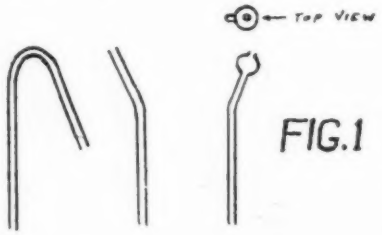


FIG. 1

The balloon, when fully blown, should have a diameter of at least a foot. Before using, it should be stretched by blowing it up by mouth a few times.

When everything is in readiness, arrange the apparatus as in figure 2. Be sure that the glass tubing leading from the large bottle into the small one, dips under the sulphuric acid and that the tube leading from the same bottle to the balloon, is a few inches above the acid.

The chemicals are added together in the following proportions:

1 part of water, 5 parts of acid and 2 parts of zinc in the first method.

1 part of aluminum, ½ part of lye and 5 parts of water in the second method.

These proportions are only approximate.

A slow action will give a purer and consequently a lighter gas. If the action gets too vigorous, add more water.

First put the zinc in the large bottle. Then pour in a little water and finally the acid. If the other method is used, put the lye in the large bottle, then the metal

(Continued on page 43)

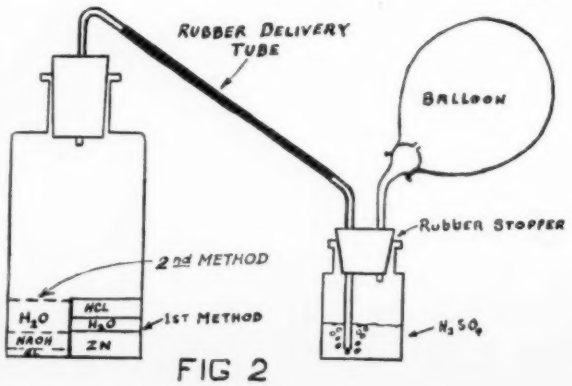


FIG 2

The Aerodynamic Design of the Model Plane

Why Variations in the Position and Area of the Stabilizer Affect the Longitudinal Stability of Your Airplane

By CHARLES HAMPSON GRANT

Article No. 27 Chapter No. 3

IN LAST month's discussion, two arrangements of the forces which will act to stabilize your airplane, were given to you. However, the *amount* of stability rendered by these arrangements depends upon the values of the forces acting and upon their relative distances from one another. After all the amount of stability produced by any force "set up" is important, for the greater the stability the more quickly will any airplane recover its equilibrium after it has been displaced from its normal flight attitude. For instance, if the righting moment produced by the product of the forces acting on the stabilizer, times the moment arm of the tail, is not great enough, the plane may crash before the righting moment has effected the recovery of the ship from some precarious flight attitude. A nose dive might be taken as a means of illustrating this.

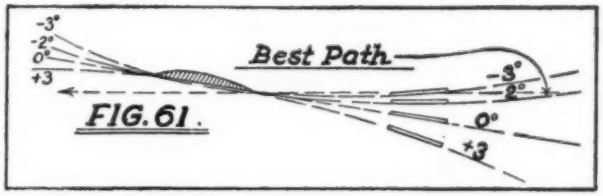


FIG. 61.

Our problem is to have the forces create the greatest amount of corrective action possible. In order to do this, let us see what factors of design influence the intensity of this corrective action.

From last month's discussion we learned that the lift of the air on the undersurface of the stabilizer pushed the tail of the airplane upward when the airplane nosed upward out of the normal flight position. The leverage with which this force actually pries the ship back into position depends upon the moment of this force. The greater the moment, the quicker will be the recovery. In this case the moment of the force acting upon the stabilizer is the product of the horizontal distance (M) of this force S from the center of gravity (C.G.), times the amount of the force S, Fig. No. 93. Thus, the greater the distance M, or the force S, the larger the righting moment will be, all other forces being equal. In other words, the moment arm (M) of the stabilizer and the force upward or downward on the stabilizer are stabilizing factors. Increasing either of them increases the longitudinal stability of an airplane.

However, the value of the righting effect of the stabilizer alone depends on two things. They are: *the area of the stabilizer and the angle at which it is set on the airplane relative to the wing.* For instance, let us take the first case. The greater the area of the stabilizer, the greater its lift will be at any given angle of attack. If the area in one case is equal to twice the amount of area in another case, the force on the stabilizer will be twice as great. In such an instance the stabilizing effect also will be doubled provided the airplane is the same in both cases in other respects.

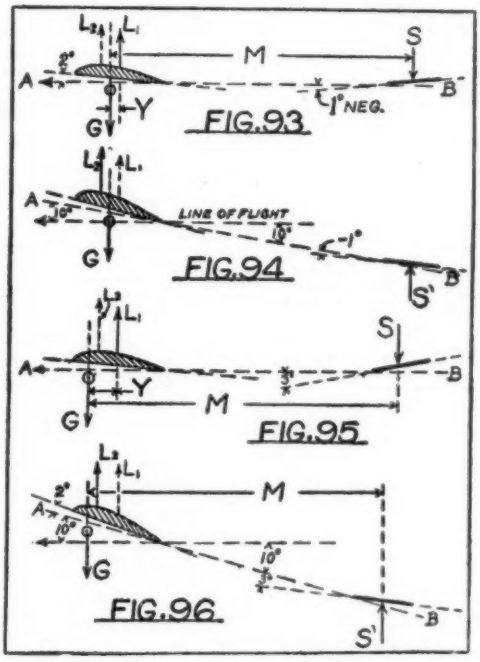


FIG. 93

FIG. 94

FIG. 95

FIG. 96

Now suppose we consider the angle of the stabilizer relative to the wing chord. A variation of this angle does not change the actual righting force of the stabilizer, but the arrangement of the forces of lift and weight acting at the center of gravity must be changed to give proper balance when this angle changes. This fact allows the force on the stabilizer to have greater effect if the angle between wing and stabilizer is greater and less effect if it is smaller. This does not mean that the stabilizing force is greater or smaller, but that the *disturbing forces* become less with a great angle between stabilizer and wing. The corrective forces therefore have a greater effect.

One of the first important facts that a model builder learns when he takes up this instructive study is that the wing and the stabilizer cannot be placed on an airplane at the same angle of incidence with no difference in angle between the two surfaces. Usually several hours are spent in every model builder's life trying to fly a plane with this arrangement of surfaces. He realizes sooner or later that something is wrong, for his plane is exceedingly unstable. Then one fine day without thought he raises the front edge of his wing so that the wing chord is at an angle with the stabilizer. To his astonishment the plane flies with unusual stability, recovering its balance after a displacement while in flight. Further experiment on the part of the model builder generally divulges the cause of the improvement.

Briefly stated, the reason for the stabilizing effect of the tail plane in such a combination is that for any given increase in the angle of the airplane to the normal line of flight, the lift of the stabilizer increases proportionally more than the lift on the wing. Thus the tail rises faster than the wing until the plane has assumed normal flight again.

Now suppose we carefully analyze the situation in detail. In Fig. No. 93 we have an airplane with a stabilizer set at one degree negative, the lift on the wing acting at a point on the wing indicated by arrow (L), and the weight of the airplane acting at the center of gravity, indicated by arrow (G). As the stabilizer is set at a negative angle, it creates a downward pressure at the tail when the plane is in normal level flight, indicated by arrow (S). Thus, in order to have the plane balance and not have the tail pulled down by this force, the center of weight of the plane must be located ahead of the lift (L). This balances the down pressure on the stabilizer. For the sake of discussion we will say that with a force (S) on the stabilizer, the center of gravity must be located a distance (Y) ahead of the lift (L).

Now suppose a disturbing force noses up the plane so that it is flying at an angle of ten degrees to the air flowing against the wing and stabilizer as in Fig. No. 94. The lift force (L) has now moved forward to position (L'), ahead of the force of gravity (G). Under these conditions

(Continued on page 38)

THE NATIONAL AERONAUTIC ASSOCIATION JUNIOR MEMBERSHIP NEWS

1934 National Championship Meet

NEXT month in these pages will be found the complete rules for the 1934 National Championship Model Plane Meet. There will be instructions about writing for entry blanks and other information. All prospective entrants are requested not to write to any of the several sponsors until these instructions are printed next month as the rules are not completely formulated as this issue goes to press. From all indications the 1934 Meet will exceed all previous meets in attendance.

The rules for the MOFFETT INTERNATIONAL CONTEST are published in this issue for the benefit of foreign entries. Much interest in this event has already been shown by Australia, Canada, England, Italy, Scotland and other countries.

The Moffett International Contest

THE Moffett International Contest for the Rear Admiral William A. Moffett Memorial Trophy will be held as a part of the National Championship Model Plane Meet at Akron, Ohio, June 27-29. This contest is for outdoor fuselage type model airplanes.

The Contest is for duration of flight according to the rules of the National Aeronautic Association.

The models shall be so constructed that the effective wing area shall be not less than 100 square inches and not more than 200 square inches. (This applies to main supporting surfaces only; tail surfaces are not counted).

The maximum cross sectional area of the fuselage shall be not less than equal to the formula:

$$\frac{(\text{Length of model over-all})^2}{100}$$

In this formula the propeller is not considered as a part of the over-all length.

The weight of any model shall be at least one ounce avoirdupois for each 50 square inches of effective wing area.

Any form of power excepting rockets may be used.

Models from foreign countries may be flown by proxy if the entrant is unable to attend. Proxy may be appointed by the entrant and if not so appointed the officials will appoint a qualified flyer.

Any country is allowed a maximum of six entries but no individual is permitted to enter more than one model.

Entries shall be made through the Society in each country affiliated with the Federation Aeronautique Internationale or through the model plane governing section of such Society.

Entrants shall be bonafide citizens of that country which they represent.

Entries shall be certified to the National Aeronautic Association, Dupont Circle, Washington, D. C. Models shall be shipped to N.A.A. Contest Committee, Mayflower Hotel, Akron, Ohio, to arrive not later than June 25, 1934. Certification shall be made early enough so that it shall reach N.A.A. Headquarters in Washington not later than June 15, 1934.

Shipping costs to and from the contest shall be at entrant's expense. Instructions should be enclosed in shipping case with model specifying whether model is to be returned to entrant. Copy of entrant's certification should also be placed in the case with model.

The above rules are for foreign entrants. American and Canadian entrants will have preliminary trials to determine the six entrants for each country. These trials will be held at Akron as a part of the National Championship Meet.

New Contest Rules

THE Contest Committee formally adopted a number of changes in the model plane contest rules at its regular meeting in Washington March 2. The complete rules as they now stand are published in full in this issue.

CATEGORIES

The National Aeronautic Association recognizes official records in the following categories for junior, senior and open competition:

I-N-D-O-O-R-S

STICK MODELS

Airplanes
- Hand-launched ..... Class B, C.
- R.O.G. ..... Class A, B.
- R.O.W. ..... Class A, B.
- Amphibian ..... Class A, B.

Gliders
- Hand-launched ..... Class A, B, C.

Autogiros
- Launching optional, no classes for size.

Ornithopters
- Launching optional; no classes for size.

Helicopters
- Launching optional; no classes for size.

FUSELAGE MODELS

Airplanes
- R.O.G. ..... Class B, C.
- R.O.W. ..... Class B.
- Amphibian ..... Class B.

O-U-T-D-O-O-R-S

STICK MODELS

Airplanes
- Hand-launched ..... Class C, D.
- R.O.G. ..... Class C, D.
- R.O.W. ..... Class C, D.
- Amphibian ..... Class C, D.

Gliders
- Hand-launched .. Class B, C, D.
- Catapult-launched .. Class C, D, E.
- Tow-line-launched .. Class C, D, E.

Autogiros
- Launching optional; no classes for size.

Ornithopters
- Launching optional; no classes for size.

Helicopters
- Launching optional; no classes for size.

FUSELAGE MODELS

Airplanes
- R.O.G. ..... Class C, D, E.
- R.O.W. ..... Class C, D.
- Amphibian ..... Class C, D.

NATIONAL AERONAUTIC ASSOCIATION
DUPONT CIRCLE
WASHINGTON, D. C.

I hereby make application for membership in the National Aeronautic Association as a Junior Member.

I enclose fifty cents for initiation fee and first annual dues. (Use check or money order.)

Name .....
(Please print or type)

Street .....

City ..... **State** .....

Date of Birth .....
(Month, Day, Year)

Approved .....
(Parent sign here, if applicant is under eighteen)

National Aeronautic Association
Model Airplane Definitions and Competitive Rules

DEFINITIONS AND CLASSIFICATIONS

Adopted March 2, 1934

All models are classed as follows:

CLASS A—A model is in class A when the area of its effective main supporting surfaces does not exceed 30 square inches.

CLASS B—when the area exceeds 30 but is not over 100 square inches.

CLASS C—when the area exceeds 100 but is not over 150 square inches.

CLASS D—when the area exceeds 150 but is not over 300 square inches.

CLASS E—when the area exceeds 300 square inches.

RISE OFF THE GROUND (R.O.G.)—A model airplane of the R.O.G. type has landing gear that permits it to take off from the ground or floor starting from a standstill under its own power. The landing gear must be strong enough to support the model while taking off and landing, and its usefulness must be demonstrated by gliding the model from a height of at least four feet, landing without damage and without nosing over. The wheels shall turn freely and be of such size as to permit the model to taxi freely on an ordinary platform. The minimum diameter of the wheels shall be not less than the following:

Class A—½ inch Class D—1½ inches
Class B—¾ inch Class E—2 inches
Class C—1 inch

RISE OFF WATER (R.O.W.)—A model airplane of the R.O.W. type can take off from or alight on water. It must demonstrate its seaworthiness by taxying at least six feet on the surface of the water. It must take off from the water starting from a standstill under its own power.

AMPHIBIAN—A model airplane of the amphibian type has the combined characteristics of the R.O.G. and R.O.W. types, fulfilling these specifications without substituting landing gear. The model's time shall be the average of two flights, respectively, the best one of three R.O.G. flights and the best one of three R.O.W. flights.

HAND-LAUNCHED—A model airplane is hand-launched when it is released into flight directly from the hands of the launcher. The model shall be launched from an elevation of not more than six feet above the ground or floor.

GLIDER—A model glider is similar to a model airplane but without power plant. It may be launched in three ways: (1) hand-launched, (2) catapult-launched, (3) tow-line-launched. Hand-launching is defined above. Catapult-launching is accomplished by exerting an initial flying impulse by means of a sling-shot or similar device. Tow-line-launching is accomplished by pulling the model into the air with a string from the ground like a kite. The tow-line shall be no longer than 100 feet and shall be released from the model by the launcher. The model's time starts when the tow-line is released. Model gliders need have no landing gear, but in other applicable respects shall conform to the classifications of model airplanes, and resemble man-carrying gliders.

PUSHER—A model airplane of the pusher type has its propeller or propellers behind the main supporting surfaces.

TRACTOR—A model airplane of the tractor type has its propeller or propellers forward of the main supporting surfaces.

TRACTOR-PUSHER—A model airplane of the tractor-pusher type has one or more propellers forward of, and one or more propellers behind the main supporting surfaces.

INDOOR MODEL—A model of the indoor type is designed primarily to fly indoors. The area of the effective main supporting surfaces shall not exceed 150 square inches.

OUTDOOR MODEL—A model of the outdoor type is designed primarily to fly outdoors. The area of the effective main supporting surfaces shall be no less than 100 square inches. Outdoor models shall weigh, complete and ready to fly, not less than one ounce avoirdupois for each 50 square inches of effective wing area.

STICK MODEL—A model of the stick type has a body composed of a single stick or open framework, rather than a fuselage. Models using tubes to enclose the motors, and those that do not meet the fuselage type requirements are classed as stick models.

FUSELAGE MODEL—A model of the fuselage type has a built-up, enclosed fuselage. The minimum area of the maximum cross-section of the fuselage must correspond to the formula $\frac{L^2}{100}$ where "L" equals the over-all length of the model, excluding the propeller. The fuselage shall be of streamline form and have not less than 90 per cent of its surface area covered. Outriggers and booms may be used on fuselage type models. The fuselage shall be a structure which supports the motor, wings, empennage and landing gear. When rubber is used for motive power, it shall be contained entirely within the model.

FLYING SCALE MODEL—A flying scale model is an exact replica of a man-carrying machine, every part being proportional in size to the corresponding part of the large machine. The N.A.A. does not recognize for flight records the Flying Scale Model.

EXHIBITION SCALE MODEL—An exhibition scale model is an exact non-flying replica of a man-carrying airplane, every part being proportional in size and location to the corresponding part of the larger plane. The N.A.A. does not recognize any categories of exhibition scale models, but for the guidance of local contest committees suggested rules are given later.

AUTOGIRO—An autogiro model is supported in flight by the action of the air on vanes which rotate freely on an approximate vertical axis, supplemented by the thrust of a propeller on an approximate horizontal axis. The area of the vanes' surface shall be not less than that of the fixed wing. There are no size-subdivisions of autogiro models. The launching method is optional, either hand-launched or R.O.G.

HELICOPTER—A helicopter model must rise without any assistance and be supported in flight solely by the lift of a power driven air-screw or vanes. There are no size-subdivisions of helicopter models.

ORNITHOPTER — A heavier-than-air craft which derives its lift and propulsion solely from the flapping of wings. There are no size-subdivisions of ornithopters.

VACUUPLANES, ROTORPLANES and other experimental types are not yet classified or subdivided as they are not sufficiently standardized.

LIGHTER-THAN-AIR CRAFT are not classified.

Contest Rules

ACCEPTANCE OF RECORDS — No record is official until it has been accepted by the Contest Committee of the National Aeronautic Association. Only duration records for flying models are officially recognized. All records to be eligible for recognition must be made in sanctioned meets or under specific direction of the Contest Committee of the N.A.A. This committee shall be the final judge in the interpretation of all rules.

WHO MAY COMPETE—Contestants in any official contest for establishing records or for N.A.A. trophies shall be members of the N.A.A. or of an affiliated organization. Contestants younger than 16 years are classed as juniors. Those over 16 but under 21 years are classed as seniors. Contestants over 21 are eligible for competition in the OPEN class. There are separate categories of records for each group, the records being classed as junior, senior or open, according to the contestant's age when the record was made.

OFFICIALS — The following officials shall be present to conduct a contest:

(a) Contest Director, who shall be officially recognized by the N.A.A.

(b) At least two timers timing each flight. Timers may also act as examiners.

(c) One recorder who may also act as a timer or examiner.

(d) Any additional assistants as circumstances warrant, may serve.

DESIGNS OF MODELS—There are no restrictions on the design of the models except that they shall meet the specifications named in the definitions and classifications. However, the models must be so designed that they drop no part in flight.

NUMBER OF MODELS—Each contestant will be allowed a maximum of three models in each event, and he may use any or all to complete his flights.

NUMBER OF FLIGHTS—Each contestant will be allowed a total of three official flights. A flight is a start that lasts 10 seconds or longer in an outdoor contest, and 30 seconds or longer in an indoor contest. Any flight less than that or failure to fly promptly when called shall be judged a delayed flight. Three successive delayed flights shall be considered as displacing one official flight. A contestant may at his option, declare a delayed flight when his model meets an obstruction that prevents further flight. If not declared to the timers at the time of the collision such a flight is to be judged as an official flight. However, should subsequent official flights fail to surpass the duration of a delayed flight that has been declared, the contestant will be entitled to reinstatement of the delayed flight as official. If a contestant fails to make one flight of sufficient duration to be an official flight in his nine possible chances, his best time will be recorded as the time of his best flight.

TIME OF FLIGHTS—Flight time starts the instant a model is in flight and ends when the model first touches the ground or floor after being launched, or meets an obstruction that prevents further flights. Time also ends when a model passes from the timers' sight, but the timers shall make every effort to keep the model in sight until it lands. If a model meets an obstruction and falls free independently and resumes flight within ten seconds, time shall continue uninterrupted. However, if an obstructed model can be freed by any means within 60 seconds, time will continue but will not be credited for the period that model was not actually in flight.

GASOLINE POWERED MODELS—Any model using internal combustion power is limited to a total weight without fuel of seven pounds. The amount of fuel that may be carried for record flights is limited to one quarter ounce, liquid, for each pound of weight of the model. The term "fuel" is interpreted as the mixture which is taken or forced into the cylinder or cylinders.

BUILDER OF MODEL—Each contestant shall build his model himself with the exception of bearings, washers and power plant. The design may be obtained from any source.

TERRAIN—The terrain for outdoor meets shall not vary as to difference of level more than standard practice for landing areas of airports.

DISQUALIFICATIONS—Any contestant who breaks any rule of a contest, or conducts himself contrary to the ordinary requirements of common courtesy, may upon recommendation of the officials be disqualified. Models broken in landing are not disqualified.

PROTESTS—Protests will be considered only when presented in writing to the local Contest Director on the day of the meet.

NOTES

These rules are subject to change or enlargement by the Contest Committee of the N.A.A.

Throughout, there is no suggestion of limit to the length of fuselage, motor, or motor stick. It is believed that the limiting of wing area is sufficient. So long as models are within the specifications of the Definitions and Rules they are eligible.

Speed records will not be recognized until it is clearly evident that there is need of this. Speeds of over 60 miles an hour are attained by models travelling a distance of 150 feet. It is difficult to time speed flights accurately. Hence the speed contest is not encouraged.

Altitude records are not recognized as accurate measurements are not obtainable.

Distance records are not recognized as they rarely reflect a model's true merit. The air is seldom still enough for distance contests.

There is no official recognizance given of whether a model is a pusher or tractor, or whether more than one propeller or motor is used.

Except where specified, the power is optional. Experiments with compressed air, internal combustion, steam, and other types of power are to be encouraged.

Rocket planes using explosives, are not encouraged.

No separate categories are as yet listed for types of aircraft such as rotorplanes, paddle-wings, and other experimental types.

Should experience show that additional categories are needed, they will be listed; if certain categories prove to be unwarranted, they will be dropped.

Suggestions and recommendations will be considered by the Committee on Junior Activity and Model Building, National Aeronautic Association, Dupont Circle, Washington, D. C.

SUGGESTIONS FOR EXHIBITION SCALE MODEL CONTESTS

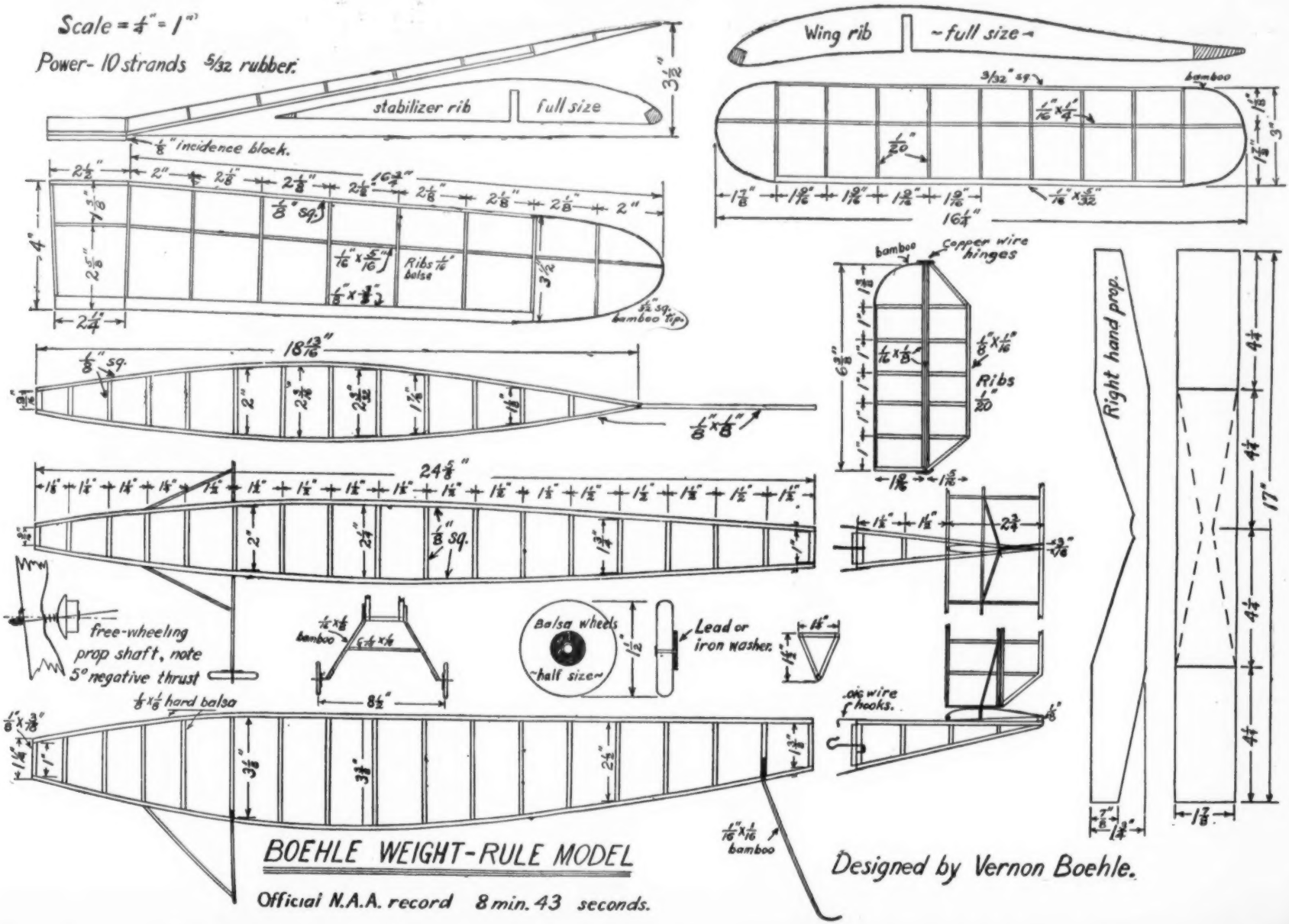
The Exhibition Scale Model Contest is not a flying event, but a contest of workmanship. The scale model is a miniature reproduction of a man-carrying plane, complete in as many details as the builder's skill will permit. These models are judged on their resemblance to the original, and on their workmanship.

A suggested Scale Model Score Card follows:

EXHIBITION SCALE MODEL SCORE CARD Entrant's Number .....

	Full Value	*Judge's Estimate*
GENERAL WORKMANSHIP		
1. Neatness of workmanship	15	
2. Amount of detail (This includes such details as controls, engine parts, upholstery, fire extinguishers, instrument board details, lighting, etc.)	15	
3. Originality (This includes originality in reproducing details and parts of the entire model)	10	
4. Color and finish	10	
Total	50	
FIDELITY OF SCALE		
1. Fuselage (Length, depth, width, shape similarity, etc.)	10	
2. Wings (Span, chord, airfoil)	10	
3. Landing gear	10	
4. Empennage	10	
5. Engine, propeller, etc.	10	
Total	50	
Grand Total	100	

Signed .....

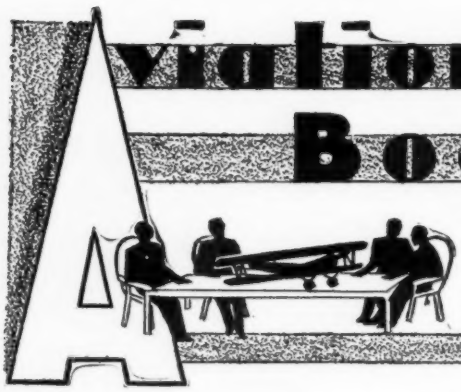


BOEHLE WEIGHT-RULE MODEL

Official N.A.A. record 8 min. 43 seconds.

Designed by Vernon Boehle.

Aviation Advisory Board



Conducted by
CHARLES HAMPSON GRANT
Chairman of the Board
Formerly of
The Technical Section, Air Service, U. S. Army

THE usual deluge of questions has flooded the mail box of the Advisory Board this month. Many of them pertain to the manufacture and use of microfilm. In a future issue we will publish a very complete article on this subject. However, for those who cannot wait for this information, we will give a few hints which will help them.

One young man named Ernest Patrikas of 12 Van Buren Terrace, Lynn, Mass., wants to know what microfilm is.

Answer: Briefly, it is a thin film of nitro-cellulous material which is about 1/8th the weight of tissue paper. It may be made from several materials such as ordinary airplane dope, airplane cement, clear lacquer or commercial collodion. We especially recommend the latter material. This may be purchased at a drug store. In order to prepare it for use, allow the bottle to stand uncorked for about twelve hours in order that the ether in the solution may evaporate. This will make the solution thicker or less viscous. It is ready for use when the liquid attains the consistency of castor oil. This material is made by letting a drop of the liquid fall on the surface of smooth water; a tub or basin may be used for this. The liquid immediately spreads out in all directions over the water's surface. It is lifted from the water by a wire hoop which is placed underneath the film and raised gently.

A few drops of castor oil added to the collodion before it is spread on the water, mixing it thoroughly, will make the film fairly elastic and reduce its brittleness. This material is used on light indoor models for wing covering. Several concerns (see ads in our magazine) sell liquid microfilm from which you can make the sheets.

This explanation will also answer one of Mr. John H. Cleveland's questions. He lives at 5025 Russell Avenue South, Minneapolis, Minn. We have also noticed that many young men want to know what "lubricating the rubber" means and what material is used for this purpose.

Answer: Lubricating the rubber means applying some material or treating the rubber in some way that will allow the strands to slip over one another without friction and without sticking together. By doing this, more turns can be put into a motor of any given length. A good rubber lubricant can be made as follows:

Take one ounce of green soap, sometimes called soft soap and mix it with one ounce of glycerine. To this mixture, add one pinch of salicylic acid. If you want to make four ounces of this material, double the quantity of the ingredients. This mixture should be spread onto the rubber and worked in with the fingers to make sure that the entire surface of the rubber strands is covered with it.

Here we have a young man who gives us a pretty big order; Earl Star of 240 Union St., Lawrence, L. I. He asks us the question:

"How many airplanes are there in the entire world, all types included?" He favors us by adding, in parentheses, the word "approximately."

Answer: Even if we made a guess at this, it would be sure to be wrong. In order to determine accurately the number of airplanes in the world, it would be necessary to make a survey of every aircraft company in every country. Considering the fact that most of the countries are building large numbers of military aircraft under great secrecy, it is silly to try to answer such a question. Obviously the correct answer cannot be given.

[Editor's note. When young men wish to send in questions to this department, will they first endeavor to answer them themselves? Do not waste our valuable time, which may be given to some useful purpose? We say this because we find many model builders would rather sit back and have someone else do their thinking for them. In other words, they lack initiative and go-get-iveness. These young men had better drop out of aviation for only those who are keen and alive can ultimately succeed in this field.]

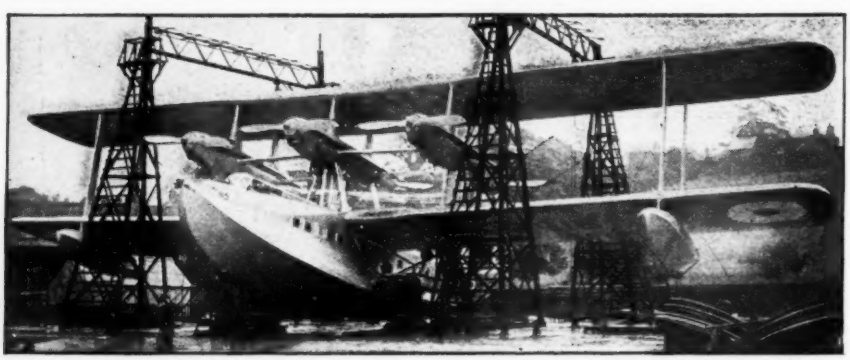
Mr. C. Rogers of 2856 N. Avers Ave., Chicago, Ill., asks us the following questions:

Question: What is a tail high landing?

Answer: This is a landing in which the tail is held off the ground with the body of the machine approximately horizontal, when the wheels strike the ground. Landing in this manner is very dangerous and often results in the ship nosing over. The ideal landing is one in which the wheels and tail skid contact the ground at the same instant.

Question: How is a plane looped?

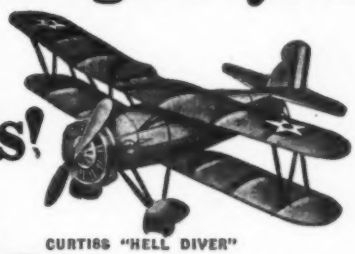
Answer: Briefly, an airplane is looped in the following manner. It is nosed over until extreme speed is attained, then with the wings level, the stick is pulled straight back. By doing this the nose is lifted. The stick is held in this position while the ship loops upward and turns over on its back. At this point the engine is cut off by closing the throttle and the stick is pushed forward slightly until the ship is passing down along the last leg of the loop and the nose is rising into a horizontal position. As the ship is going into the horizontal position, pull the stick back gradually not suddenly, so that the plane noses upward gradually, for the greatest part of the strain on the wings is at this point.



The Short R6/28 flying boat is the largest military airplane in the world. It has a span of 120 feet and is powered by six Rolls Royce engines of 820 h.p. each. The maximum weight is 70,000 pounds

These Popular IDEAL Models give you New Building and Flying Thrills!

FOKKER TRIPLANE


CURTISS "HELL DIVER"

These are the famous "Ideal-O-Plane" Flying Models that have been built by thousands of enthusiastic model fans. Every design has been tested, corrected and perfected before it was put out—the result is the most perfect Models that can be made in this type of construction. Each Kit contains everything needed to build the entire Model. All flat parts are clearly stamped on sheet balsa ready to cut out. Wire parts fully formed· colored Jap tissue, balsa strips, bamboo, smooth hardwood wheels, live rubber, cement and a full size three-view Plan with full and detailed Instructions. The easiest Model of this type to construct. Look over these 12 fine designs. Pick the ones you want to build and send along your order now.

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(NO STAMPS, PLEASE)

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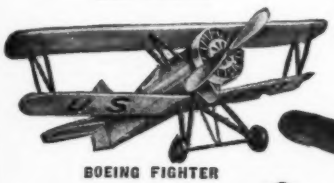
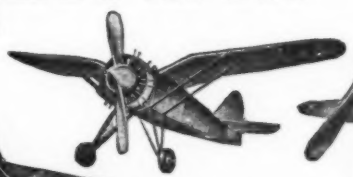

BOEING FIGHTER

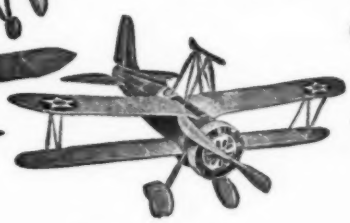

POLISH FIGHTER

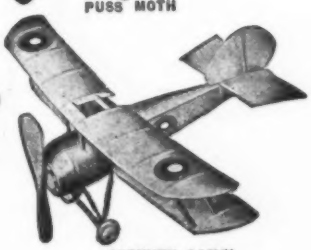
PUSS MOTH

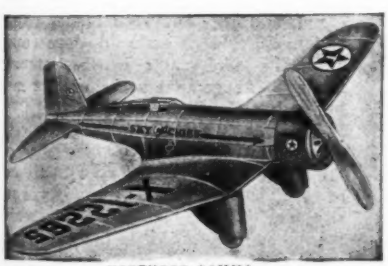
HEATH PARASOL

BRITISH S. E. 5

MONOCOUPE


CURTISS SPARROW HAWK


SOPWITH CAMEL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The first practical model making knife; handiest tool you ever saw! 7¼ in. long, just like a pen-holder, with razor-sharp, spring-steel blade, which can be sharpened repeatedly. Protector included to fit over blade when not in use.

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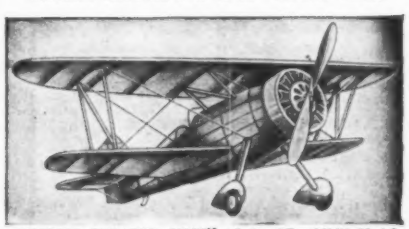
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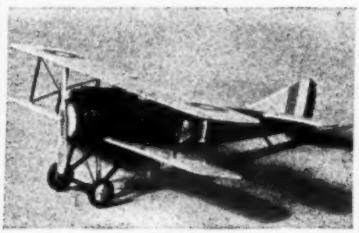
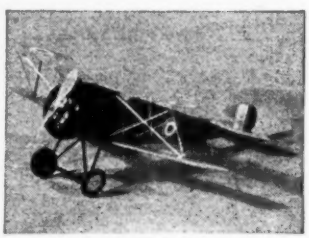


S.P.A.D.



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The S.P.A.D. and Nieuport are a seventy cent value and come to you neatly packed complete with colored insignias, luster lacquer, metal props, full-size plans, clear-grained balsa, cement and dope. They are all ready for you to build . . . so send in your subscription today and we'll mail them to you.

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On the Frontiers of Aviation

(Continued from page 13)

Total volume for payload	105 cu. ft.
Gross weight	5800
Empty weight	3325
Useful load	2475
Pay load	variable
Power loading	10.54
Wing loading	19.72
Maximum speed at r.p.m. at 5000′ at full power	230 to 2000
Cruising speed at r. p. m. at 8000′ at 75% power	205 to 2000
Landing speed-sea level-without flaps	63
Maximum rate of climb	1500
Service ceiling	22000
Maximum gas capacity-gallons	116
Maximum oil capacity-gallons	10
Cruising range-miles	720

The Lockheed "Electra" is another Lockheed of outstanding performance. It is outstanding because:

It combines speed and comfort with low cost operation and maintenance.

Provides generous cabin, cockpit, and cargo space.

Cruises at 190 m.p.h. with 2200 lbs. of payload.

Bi-motor power plant of only 840 h.p.

All-metal construction.

Slow safe landings with simplified wing flaps.

Important streamline developments and proven retractable landing gear.

Simple and effective wing flaps are incorporated which materially reduce the take-off and landing speeds. With flaps in operation the gliding angle is reduced from approximately 14:1 to 8:1. Horizontal and directional balance is accomplished with adjustable flaps located at the trailing edge of the rudder and elevators.

The "Electra's" small overall dimensions, clean design, and all-metal construction, are the answer to the demand for light weight and economical high speed performance.

The cabin is completely sound-proofed by Western Electric engineers who are the acknowledged leaders in this field.

Excellent vision is possible from the pilot's cockpit, which is located forward. Conventional wheel controls are provided with complete instrument equipment, including a Sperry Directional Gyro and a Sperry Artificial Horizon. Provision has been made for the installation of a complete two-way Western Electric radio. All electrical wiring of the ship is enclosed in a metal conduit system with conveniently located junction boxes.

The retractable landing gear is operated electrically and has an auxiliary emergency hand-operated system. The wheels swing directly back into the rear of the nacelles and are completely faired into the wing in the retracted position.

In all, the "Electra" offers the greatest combination of efficient high speed performance that modern requirements can dictate.

Specifications of the "Electra" are as follows:

Type	12 PCLM
Make of engine	2 Wasp Jrs.
H.P. at rated r.p.m. at rated altitude	420 at 2200 at 5000′
Dihedral-median line	5°34′
Make of propeller	Smith controllable
Total volume passenger cabin-cu. ft.	300
Front baggage compartment volume	40.0
Wing baggage compartment volume	28.0
Gross weight	9000
Empty weight	5455
Useful load	3545
Pay load	Variable
Maximum speed at 5000′	215
Cruising speed at r.p.m. at 5000′	190 at 2000
Landing speed-sea level (with flaps)	63
Max. rate of climb-sea level	1350
Service ceiling	20,000
Cruising range-mile	750 at 48 gal./hr.

The B/J Mailplane is radically different from the other modern high speed commercial planes, being a biplane and used for mail only. The design was developed from that of the B/J OJ-2 observation plane, and it will undoubtedly have a similar performance to the military craft.

High speed will be approximately 185 m.p.h. at 11000 ft. altitude with a 500 h.p. engine.

The B/J Mailplane is at present just a proposal and there has not yet been any word as to whether the B/J Aircraft Corporation of Baltimore, Maryland, has started production on the ship.

BUILD A SOLID SCALE MODEL OF THE LOCKHEED "ELECTRA" AND B/J MAILPLANE

Balsa wood or white pine may be used in the construction of the models. If you desire to make models proportional to real planes, double the dimensions of the "Electra" plans.

The only tools necessary for building the models are a razor blade, small, sharp chisel, and jig saw. Sandpaper (coarse and fine), tube of ambroid, dope (colors optional), and paint brushes are also needed. The general procedure for making both models is identical.

The wings are made first. Draw top view of wings on stock and then cut around border with jig saw. In the case of the "Electra" make the wing in two sections, each section containing one of the motor nacelles. Make the top wing of the Mailplane in three sections as shown and make the dihedral angle when assembling the plane.

Using a small, sharp chisel, shape out airfoil sections on wings as shown by cross-sections on plans and at the same time, taper wing tips of B/J and entire wing of Lockheed as shown in front elevations. Lay straight rule over wing surfaces in order to see if there are any grooves present which may be detected by a small ray of light passing between the rule and wing surface. Coarse and fine sandpaper may be used in leveling off the wing surfaces. Lay wings aside and begin work on the tail surfaces.

By referring to the top, side, and cross-section elevations, cut the tail units to shape, which consist of rudder, fin, elevators, and stabilizer. The fin, which is

(Continued on page 36)

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Printed Balsa	Wing Adhesive	Rubber
Ribs and Bulkheads	Music Wire	Bamboo
Colored Insignia	Celluloid	Reed

FULL SIZED PLANS, building instructions and everything to build a complete model.

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CURTISS SWIFT 18" Wing Span

HAWK P6-E 15" Wing Span

LOCKHEED SIRIUS

15" Wing Span

PUSS MOTH 18" Wing Span

BOEING TRANSPORT 247

18" Wing Span

HOWARD RACER "PETE"

VOUGHT CORSAIR 15" Wing Span

BOEING P12 15" Wing Span

BAT 18" Wing Span

STINSON RELIANT
CURTISS SWIFT
HOWARD PETE
BOEING TRANSPORT
PUSS MOTH
} 18" WING SPAN

15" WING SPAN { HAWK P6-E, BOEING P-12, VOUGHT CORSAIR, LOCKHEED SIRIUS

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These new models are sensational in their flight performance. Flights over 300 feet are GUARANTEED with these snappy LARGE, long distance flyers, with their slow-winding propellers and bright colors. These models are the choice of the most critical model builder and judge.

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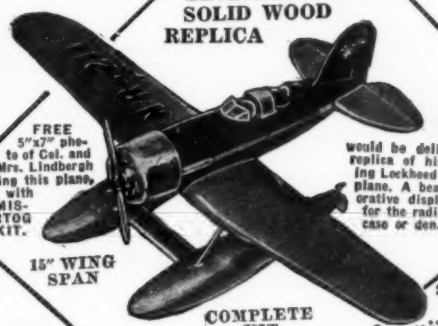

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13/16" . 5c
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¾" long 5c
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Dummy Ratchet Gun
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	Set
For 12" model	10c
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.....	.....	1½" 10c	1½" 10c
.....	.....	2½" 15c	1½" 15c
3¼" 25c	.....	3¼" 20c	.....
4" 30c	4" 35c	4" 25c	4" 30c
4½" 35c	4½" 45c	4½" 25c	4½" 40c
5" 35c	5" 50c	5" 30c	5" 45c
5⅝" 40c	5⅝" 60c	5½" 35c	.....
6¼" 40c	6¼" 70c	6" 40c	.....
7" 55c	7" 80c	6½" 45c	6" 60c
		6¾" 50c	

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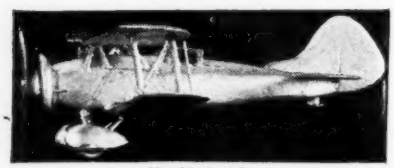

Vought Corsair
Vought Corsair
Sikorsky S-41
Lockheed Orion
Curtiss Sparrow Hawk
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Kits contain full sized plans, clearly printed balsa, wheels, sandpaper, insignias, 2 bottles lacquer, cement.
ALSO—Eight 12" Flying Model Kits, ea. 35c
All Tropical Kits are complete.....
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On the Frontiers of Aviation

(Continued from page 34)

faired into the fuselage may be done so later with the use of putty when the assembly takes place. A razor blade may take the place of the jig saw and chisel in shaping the tail units. Be careful and take plenty of time. Sandpaper all parts first with coarse sandpaper and then fine sandpaper to make ready for painting them. Lay units to one side and begin construction of the fuselage.

The fuselage of a model is always the most difficult part to build, but if following directions are adhered to closely, you will have no trouble whatsoever. Draw outline of fuselage on stock as you did the wings and tail surfaces. Cut along outline with jig saw. Next draw top elevation of fuselage on stock and once more cut. With razor blade and chisel, finish off the fuselage, referring to cross-sections on plans. If cabin or cockpit is to be desired hollowed out, cut top off fuselage and chisel the insides out. The interior should be painted next. It is preferable to paint the walls, ceilings and floors a light color, and all fittings, etc., a dark color so they will stand out more clearly when the top of the fuselage is once more ambroided in place. In the case of the B/J, a movable enclosure may be made by bending thin strips of wood to which may be ambroided isinglass. Isinglass may also be used for the windows of the "Electra."

The details of the motor shown in the B/J plane may also be used for the "Electra" model, since both planes contain approximately the same motor. The cowlings may be made out of thin cardboard bent to the required shape. The cardboard may be moistened and then thoroughly dried so as to hold its shape. The cylinders are perfectly oval-shaped around which wire or thread may be wound in order to make them look realistic. Make two small pushrods for each cylinder, from straight pins.

The small black rectangle in the rear of the Lockheed denotes the opening through which the radio antennae slides when the ship is in the air. This antennae is hauled into the fuselage when the plane is about to land.

Next carve "props" out with penknife. Use small pin as propeller shaft, which may be injected into nose of motor when assembly takes place.

Much care must be taken in the assembly of the model. Ambroid wings in place first, using wooden blocks to hold them firmly over fuselage. The wing of the "Electra" is rather simple to put in place but that of the Mailplane is a much more difficult task. It is best to ambroid the center section of the B/J wing onto the fuselage first, using the struts as shown in plans. Next join lower wing sections onto fuselage and then the remaining top wing sections. Brace wings with "N" struts. Go over all connections once more with plenty of ambroid and when they have thoroughly dried, join tail surfaces in place. Apply ambroid freely but be neat.

Next connect motors to nacelles, then cowls, and then "props."

Construct landing gear, including tail wheel, and connect in place as shown in plans.

Connect up all strut and wire bracings and then go over all connections once more with ambroid to insure strength.

Give the model several coats of dope until you obtain a nice smooth finish. The colors are optional, although the motors and tires are usually painted black. The models will then be completed.

How the Aeroplane Was Created

(Continued from page 21)

cessful attempts, he gave up the idea, convinced that it required more power than he had available to accomplish this. He could not attain a speed over the water greater than twenty-five miles an hour and cautious against taking off against too strong winds, he decided to abandon the scheme for a while.

In 1909, with A. M. Herring, formerly an aid of Octave Chanute, he formed the Curtiss-Herring Co., and immediately after brought out their first product, a conventional box-kite biplane with some improvements and a better eight cylinder motor of the vee type that Curtiss was beginning to make famous. In this model, the "Silver Dart," the first box elevator was placed forward, while the rear outriggers carried the rudder for directional control. With this machine, Curtiss flew in a closed circuit of twenty-four and seven-tenths miles for a duration of thirty-two and one-half minutes, on June 26th, 1909, thereby winning the second leg on the Scientific American trophy. Later on in this same year he made some flights at the Morris Park race track at New York, being the first to fly in public exhibition in New York State.

By this time he had well standardized his design of flying machines and had incorporated such features as tripod three wheel landing gear with a braking shoe operated by the wheel control arm, ailerons controlled by swaying the body to obtain movement of these surfaces, and by the development of a very efficient and high ratio of power to weight motor. Proof of the reliability of his machine and motor are shown in his wonderful flight against Bleriot in which he wrested the speed record from a large field of worthy opponents and this with a motor which he had no time to test before shipping abroad, and which in the contest was subjected to the most adverse conditions.

Thus, we note that Glenn Curtiss was making real progress in aviation, for by the end of 1910 he had brought it at least in the United States to a basis of fair reliability and standardization along with many trophies for speed and distance. On January 10th, 1910, he made a new speed record of 55 miles an hour carrying a passenger and on May 29 the same year he made his now famous flight from Albany to New York City, a distance of 150 miles in two hours, with only two landings to refuel, thereby winning the third and final leg on the Scientific American cup.

In 1911, Lieut. Ely of the U. S. Navy, further demonstrated the reliability of Curtiss' machine and motor, by his remarkable feat of landing on the deck of the Battleship Pennsylvania lying in the

(Continued on page 40)

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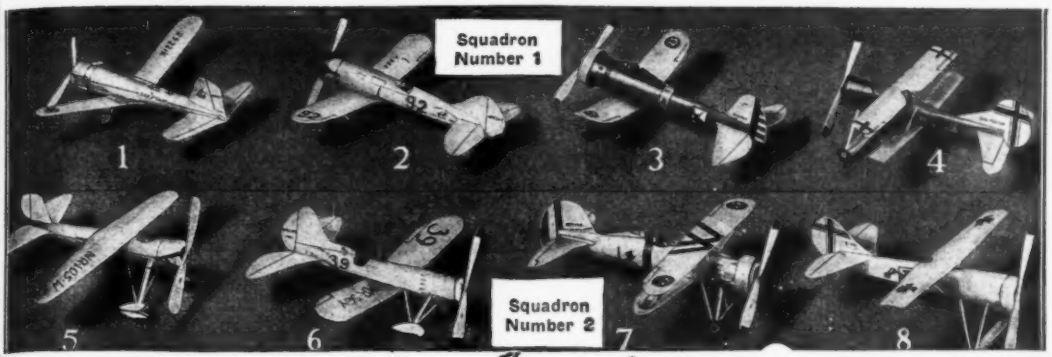

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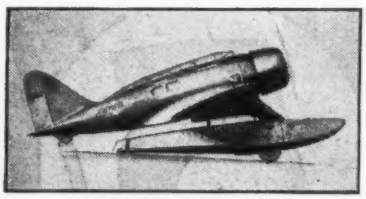

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The Aerodynamic Design of the Model Plane

(Continued from page 27)

(G) is acting downward to the rear of lift (L'), thus tending to pull the tail of the plane down still more. However, the stabilizer has changed its angle positively ten degrees, from —1° to +9°, so that it generates considerable lift, probably about four or five times as much upward force as it generated downward force at a —1° angle. This lift is sufficient to push the tail upward against the downward pull of (G), especially so when it has the leverage of the tail moment arm (M).

For comparing the effect of increasing the angle between the wing and the stabilizer, suppose we set the stabilizer at —3°, two degrees more negative. The angle between the wing and the stabilizer is thereby increased from 3° to 5°.

When the plane is in level flight the stabilizer will be traveling through the air at —3°, generating a downward pressure (S) on its upper surface. This pressure is about three times as great at —3° as at —1° setting of the stabilizer. So, force (S) in this case is three times as large as in our first example. The force (G) therefore must be placed three times as far ahead of (L) as in the first case. The distance (Y') between (L) and (G) is then three times (Y) in Fig. No. 95.

Suppose a force now disturbs our plane, pushing the nose up until the wings and stabilizer are at 10° greater flying angle than they are in level flight. The stabilizer is now at +7°, and the lift force has moved forward the same amount as in the first case to position (L'), Fig. No. 96. But now, looking at this diagram, we note an important point. The force of gravity (G) is located so far forward, due to the original large downward force (S) on the stabilizer, that the forward movement of the lift (L) to position (L') does not bring it ahead of (G). Thus, we have (G) pulling down the nose and the upward force (S') on the stabilizer pushing up the tail. The force (S') is smaller than in the first case, it is true, but actually the difference is not great; it is about 7/9 of the force (S') in our first example. Also instead of (G) working against it trying to pull the tail down, it is now helping it to push the tail up and right the ship. Thus the correcting effect is larger with a greater difference in angle between stabilizer and wing.

Actually the corrective effect of the stabilizer, (area remaining the same) is proportional to the difference in angle between the wing and the stabilizer, plus 3°. You probably are asking yourself why the 3° is added. In referring to the angle between the stabilizer and the wing, we mean *the effective* angle. Most readers will know by this time that a cambered wing lifts at a negative angle of attack. The angle of zero lift is about —3° or —4° on the average wing. Therefore we say for practical purposes that the zero lift angle of a wing is —3°. Thus, if the wing is set at +2°, it actually has a lifting angle of 2°+3° or 5°. Now, if the stabilizer is set at —1°, the difference in angle (effective angle) between the wing and stabilizer is (2°+3°+1°)=6°. If the stabilizer setting is changed to —3°, the difference in angle would be 8°, and the stabilizer would be 1/3 more effective in its stabilizing action.

This foregoing discussion might lead you to think that the proper thing to do in order to endow your plane with great longitudinal stability is to have a large negative angle on the stabilizer and thereby obtain a great difference in angle between it and the wing. This is not the case in actual practice. In one way this condition increases stability, but in another it causes an extreme disturbing effect, so that a medium value is usually advisable.

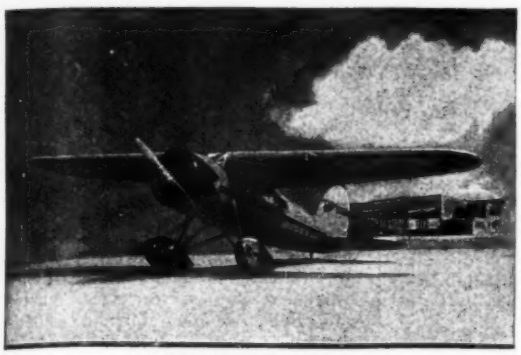
Suppose we look at Fig. No. 61. From this it can be seen that the greater the angle between stabilizer and wing the sharper is the curve of the arc which passes through the wing and tail, tangent to them. Note the arc for a —3° angle. Under speed the plane will zoom upward along this arc. This makes it obvious that at any given speed the plane will be nosed upward at a steeper angle before recovery takes place, when the arc curves sharply. (Arc has small radius).

Unquestionably many readers have had their planes zoom up sharply and then dive. This is due to a sharp nosing up tendency caused by a large angular difference between wing and tail. Then, too, the faster the plane the more sharply will it zoom because it has greater momentum which causes it to rise higher and nearer to a vertical position.

The less the difference in angle between

(Continued on page 46)

PEERLESS SCALE FLYING MODELS—ACCURATE, AUTHENTIC, REALISTIC



LOCKHEED VEGA

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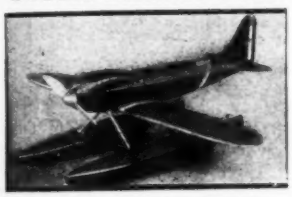
SUPERMARINE S-6-B



Span 15⅛" ½" scale Length 14"

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THE MODELS....

listed on this page are all built from Peerless kits and are exactly as represented. They are all flying models and have been tested both for accuracy in construction and for flying. When assembled as the detailed drawings show, they will not only look the same as these photos, but will fly. All of these kits contain the necessary items for the complete building of the model, nothing else is needed. All contain PRINTED WOOD, making the laying out of bulkheads and wing ribs a simple job. These are printed from regular zinc plates, a more expensive way perhaps, but one that assures accuracy. Each kit contains colored dopes, some as many as FIVE different colors. PEERLESS is striving to produce better designed Model Airplane Kits than have ever been made, and to make the materials that they contain of the highest quality.

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PEERLESS MODEL AIRPLANE COMPANY

15531 Madison Ave. (Member NRA) **Lakewood, Ohio**

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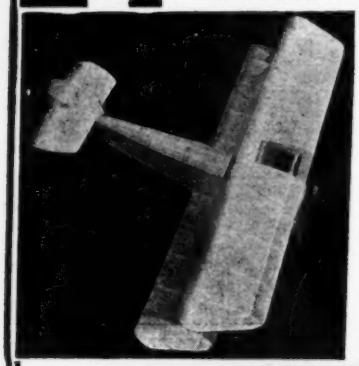

Each kit contains full size plans with instructions, all ribs, formers and curved parts clearly printed on best grade balsa, special endurance rubber, bamboo where needed, cement, dope, wire, finished ready-cut wheels, tissue, nose block, spinner block, and balsa strips cut to size. Only the best grade materials.

25c EA

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POLISH FIGHTER	S. E. 5	FAIRCHILD "22"
ARMY FALCON	AEROMARINE	AERONCA
SOPWITH CAMEL	ARMY HAWK	FOKKER D-8

Above:—
24" Sopwith Camel, 25c

Right:—
24" Fokker D-7, 25c

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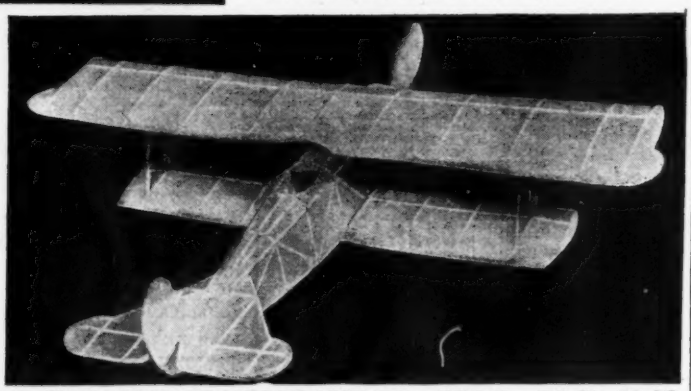

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How the Aeroplane Was Created

(Continued from page 36)

harbor at San Francisco Bay, and after a short period of rest, took off again and returned to his starting point. This feat is all the more outstanding when it is considered that the runway prepared for it was rather short and not much wider than the machine itself, necessitating a series of retards along the platform to bring the machine to a quick stop.

Although Curtiss had taken a keen interest in flying from the water before now and had even constructed a pontoon arrangement in place of the wheeled landing gear, he felt that this did not quite fill the need for a craft to be of value in wartime, in conjunction to its use with the fleet. His hydro-aeroplanes were a success but not navigable in rough water and he desired that such a craft as he had in mind, be as completely fool-proof as possible. In the latter part of 1911 these ideas took a tangible form and on July 12th, 1912, Curtiss demonstrated a craft which embodied the culmination of his experiences. The now indispensable flying-boat made its first appearance in California and was an instantaneous success and its adoption became and still is universal. Because of the heavy boat-like body to support the motor and wings and enclose the occupants, it lent itself readily to flying under the most adverse conditions and in rendering itself navigable in very rough seas.

Since Curtiss, with his wider experience than any other in over water flying, was perhaps the best equipped to accomplish such a feat, Rodman Wanamaker, in 1913, came to him with his plan to attempt a flight across the Atlantic Ocean to France, in a flying boat. Curtiss designed and built this huge flying boat and it was during the course of preliminary tests on it that work had to be abandoned, due to the entrance of France into the World War.

Unquestionably, Glenn Curtiss deserves the highest credit for the rapid growth of aviation in this country, since it was he who put it on a practical basis both as to engineering and construction, and the all important end of training students to fly. He had the foresight to visualize that not only was a new industry being born, but that it was to open an entirely new era in transportation and speed. He offered to train men from the Army and Navy to pilot aeroplanes for the government, at no cost to it whatsoever, and at his own schools, which he had established at various points over the United States.

His ingenuity in design of a high order is further attested to in the widely famous Curtiss "Jenny" or JN model, a biplane in which thousands of pilots were trained for service in the World War.

Certainly it was the prophetic vision of Glenn Curtiss that kept the United States ahead of the rest of the world during the days of the early development of the aeroplane.

Simultaneous with the work of Curtiss, there were others, too, who were moving forward in Europe, especially in France and our next chapter will deal with this group of romantic adventurers in the art of flying.

Sky Fighters of the Rising Sun

(Continued from page 7)

members, with the addition of a balsa nose and perhaps aluminum cowling. The fuselage is then covered with silk and the wings with paper. The second type uses white pine as a main structural material and an all-paper covering. Wire is very little used (being more expensive than in this country) and balsa comparatively little, Japanese modelers preferring silk or paper for covering. Rice paper, the "jap paper" of commerce, is generally used on planes having less than an 18 inch wing spread, and a still lighter paper, Genkawa, is used frequently for fuselage work. Recently the Tokyo model association has been experimenting with a third type of paper, specially developed by a manufacturer there for model work, and they have obtained excellent results with it. It is wetted before pasting on and shrinks in drying, giving a remarkably good, tight and rigid finish.

Solid models are usually built up of white pine or paulownia wood, a light, strong Japanese wood that takes color well, but is not suitable for any climate but the moist one of Japan. Lacquer is generally used instead of paint, a Japanese model builder thinking nothing of applying half a dozen coats of thin lacquer to a job, polishing each one down to give a finish that is absolutely glass-like when he gets through.

But while all this modelling was going on, the awakened interest in aviation of which it was the symbol was taking hold of the country like a fever. Enrollment in the nation's three aviation schools jumped to more than double its former figures. A commercial flying line across the Yellow Sea to Korea was organized and quickly began to carry freight and passengers.

On the very day the news of the first air battles over Shanghai came through, the newspapers opened subscription boxes at their offices. Everyone chipped in small coins, and before the end of the month the army was presented with two new planes as the gift of the people—a big twin-motored, three-seater fighter and a hospital plane. But it did not stop there. Fraternal organizations turned over the surpluses in their treasuries to the government to buy airplanes, the subscription boxes were kept open, and when a millionaire store-keeper died recently, it was found he had left half his fortune to buy new planes for the defense of the country.

As these influences began to get to work, the old, badly designed aircraft of the pre-Shanghai days disappeared—dismantled or sold off into private hands—and their places were taken by new ships whose constructional features were copied from the best planes in the world, as reported on by the commissions. One figure shows the difference. Before Shanghai, the average Japanese pursuit ship was making about 150 miles an hour. The Kawasaki fighter, the latest pursuit craft for the army, does 205.

Today the Japanese army has 11 reconnaissance squadrons, 11 pursuit and 4 bombers, with 4 more pursuit and 4 more

(Continued on page 42)

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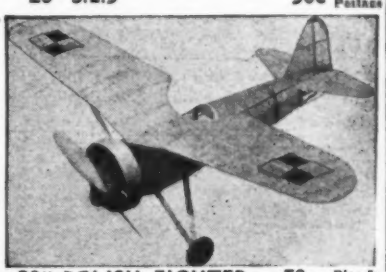

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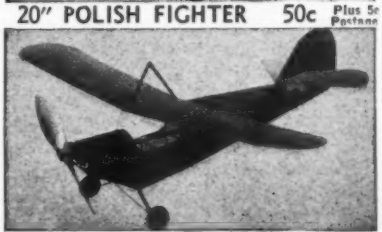

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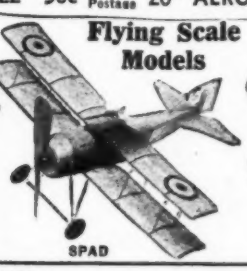

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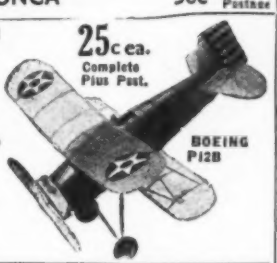

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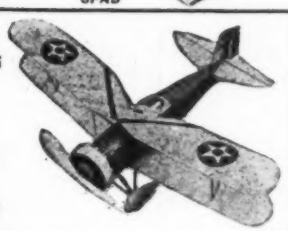

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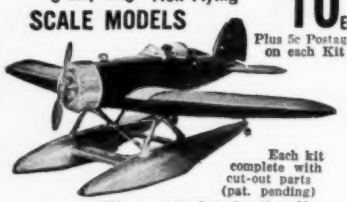

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(Illustrated) Col. Lindbergh's Lockheed Sirius

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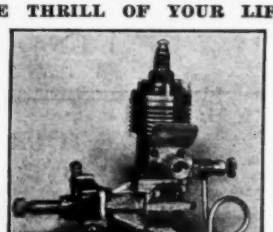

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Sky Fighters of the Rising Sun

(Continued from page 41)

bombing squadrons building. The navy has 19½ squadrons with 3 more building.

Modern Japanese planes, though all built in the country, are a queer combination of familiar types. The army has two types of single-seater pursuit craft now—the Nakajima 91 and the Kawasaki 92. The Nakajima machine is a high-wing monoplane, borrowing most of its features from the French Morane. It is a good ship, with a top speed of 198.7 miles an hour and a climb that takes it to 16,000 feet in ten minutes. The Kawasaki outfit, which won the army prize for a new pursuit ship, is a biplane, with an even better top speed, almost a copy of a Curtiss Hawk. The same machine is also used by the navy as a shipboard fighter. On all the pursuit ships the machine-guns are mounted on the sides, as on English planes.

For reconnaissance and day bombing, the army has standardized another Kawasaki type, the 88-2 and a Mitsubishi machine. Both are fairly close copies of a Nieuport-Delage observation machine, with a square-section fuselage, a 450 h.p. motor out front, about 5 hours endurance and a service speed of 136 miles per hour.

For long distance and night bombing, both army and navy have turned to German types. One is the Dornier DoF, built in Japan under German supervision, a high-wing monoplane, all-metal, twin-motored, with a two-ton useful load and a top speed of 155 miles an hour. The other is the enormous Junkers G-38, which has just been placed in production, mounting four 650 h.p. engines and able to carry a useful load of ten tons to a distance of 750 miles, at 134 miles an hour. The four new bombing squadrons are all to be armed with these huge ships and will give Japan the heaviest bombing group in the world. High speed seems to have been abandoned for weight capacity in Japanese bombers, and their practice does not favor either attack planes or diving bombers.

In the navy the types are similar with the exception that the Junkers bomber is replaced by a heavy flying boat, very much on the lines of the Dornier Wal, but with a hull like an English Short. It's a three-motored job, the motors being French Hispano-Suizas, and no plane better illustrates how the Japanese have picked up constructional features from everywhere and put them together.

Behind these fighting planes, both army and navy are well supplied with cargo-carriers, messenger planes and second-line reconnaissance machines. The most popular types are the Fokker F-VII and the Puss-Moth, both built in Japan and exact copies of the European models.

As to the training, Japanese flyers always did work hard, getting only one week-end a month free while in service, almost all their waking hours off the field being taken up with skull-practice. Before the French instructors got hold of them all this time went into military discipline, but the Frenchmen made them put more of it into the air, and now the average Japanese cadet gets as much flying experience as any student aviator in the

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world. In a couple of years they will have one of the finest bodies of trained aviators in existence.

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Well, it had a practical test only a little over a year after it was started, when the Jehol campaign in Western Manchuria opened. As far as the flyers were concerned, Shanghai was a picnic beside Jehol. At the former place they had good weather, short distances to fly and emergency landing fields every hundred yards. In Jehol there was nothing but jagged dog-tooth mountains with a few nice, soft glaciers to park on in case of accident, no landing fields at all and Manchurian blizzards driving ice, fog and snow into the faces of the aviators at 100 miles an hour. And instead of the 40 old tubs of Shanghai, the Manchurian war-lords had a set of the most modern type of pursuit planes, manned by well trained aviators.

What happened? The airmen of the Rising Sun covered themselves with glory. Those mountains and fogs were just like home; they simply disregarded them. They shot up the new pursuit squadrons of the war-lords in jig time and then kept up with the front of the advance of the Japanese army, regularly bombing every Chinese position for hours before the artillery could get up to shell it. But perhaps the most impressive feature of the whole campaign was the work of the Volunteer Squadron, a group made up of civilian pilots and model builders, who flew Fokker F-VIIs up with the front of the army. This wonderful squadron spent 1100 hours in the air in a short campaign and did everything. Time and again groups of Japanese infantry were isolated, the roads broken behind them, without ammunition or supplies. Each time one of the Fokkers came storming through the mountains, dropped packages of provisions, took back messages or landed on a dime to gather up wounded soldiers and take them back to the hospital. In all that flying in the worst country in the world they never lost a ship or a man.

Japan has gotten over her Shanghai days and the airmen of the Rising Sun are now in a class with the rest of the world's sky-fighters.

How You Can Make Hydrogen

(Continued from page 26)

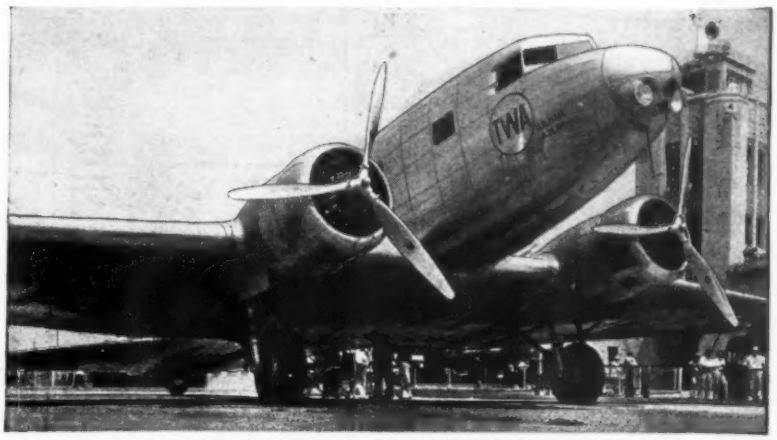
and then the water. It takes five minutes before the action starts in this method.

Let the action go on for fifteen seconds before replacing the stopper. This will drive all air out of the bottle and hence give a lighter gas.

When the balloon is completely filled, remove it and tie thread on tightly so that no gas will escape. If the action stops before the balloon is filled, add more acid or zinc, whichever is needed.

Caution: Keep the apparatus away from any flame and avoid touching the lye.

A lot of fun can be had with a hydrogen balloon. Besides recovering planes and launching gliders with one, it has been used successfully in making model dirigibles.



(Actual photo of plane taken at Glendale, California airport)

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Here is a very great novelty in rings, that is selling in thousands. It is a nicely made ring, finished in imitation platinum, and set with a large imitation diamond. It looks just like an ordinary ring, but in the shank of the ring is a small microscopic picture almost invisible to the naked eye, yet is magnified to an almost incredible degree and with astonishing clearness. There is quite an assortment of pictures that should suit all tastes. Some are pictures of bathing girl beauties, pretty French Actresses, etc., others are views of places of interest in France, Panama Canal and elsewhere; others show the Lord's Prayer in type, every word of which can be read by persons with normal eyesight. They are interesting without being in any way objectionable. **PRICE 25c, 3 for 65c, or $2.25 per doz. postpaid.** *710 page Catalog 10c.*

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Japanese Rose Bushes **bloom all the year round.** Just think of it. Six weeks after planting the seed, the plants will be in **full bloom.** It may not seem possible, but we positively **guarantee it to be so.** They will **bloom every ten weeks,** Summer or Winter, and when three years old the bush will be a **mass of roses,** bearing from five hundred to a thousand roses on each bush. The flowers are in three shades —white, pink, and crimson. The plants will do well both in and out doors. We guarantee at least three bushes to grow from each packet of seed. **Price, 10c** packet, 3 pkts. for **25c** postpaid.

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Just introduced; noted for its rapid growth. An exceptionally pretty ornamental plant. Foliage is rich dark green. Forms grand pyramidal bushes about 5 feet high. Branches very desirable for decorative purposes, wreaths, etc. **Seeds 15c pkt., 3 for 40c.**

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Amazingly Prolific—Easily Grown From Seed

The Ground Almond has a flavor that is MOST EXCELLENT, resembling the cocoanut. The meat is snow white, covered with a shell or skin of brown color. It grows close to the surface and anything from 200 to 300 Almonds may be expected from a single nut. There is no trouble whatever in growing anywhere and in any kind of soil. May be planted any time, and in eight or ten weeks from time of planting you will have a GENEROUS CROP of the MOST DELICIOUS ALMONDS YOU EVER TASTED. **Seeds 15c Pkt.**

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Novelty from China and should be grown in every garden. Seems to be a cross between Celery and Cos Lettuce. Flavor is more mild than any other cabbage. **Can be served on the table** and eaten raw or cooked like cabbage, spinach or lettuce or made into salad. Grows very rapidly, **easy** to cultivate. You can create quite a sensation by cultivating this remarkable novelty. **Seeds, 15c packet, 3 pkts. for 40c.**

TREE OF HEAVEN

This splendid ornamental tree is a native of China, and is called the Tree of Heaven, on account of its rapid growth and beauty. Very hardy, thrives in any soil, no matter how poor, and leaves from 4 to 12 feet high from seed the first summer. The leaves are from 4 to 6 feet in length, giving it a grand appearance. Nothing outside the tropics can rival it for lawn decoration. Large panicles of bloom, in season by great clusters of colored pods, make the tree a continual thing of beauty. **Packet, 15c; 3 packets 40c**

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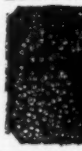
A Vine that Blooms at Night

Fills the Atmosphere with Fragrant Aroma



One of the most rapid growing vines known. Under favorable conditions this vine has been known to grow OVER 15 FEET IN A SINGLE WEEK. In a very short space of time indeed the Vine has climbed to a great height, and is covered with IMMENSE FLOWERS, from 5 to 7 inches in diameter. It is, indeed, a great novelty for, unlike other plants, the flowers OPEN AT NIGHT, and remain open for about noon the following day. In dull weather they will remain open all day. It is a most INTERESTING SIGHT to watch the opening and closing of the flowers as the colors appear and disperse. As the flowers open they give forth the most DELIGHTFUL AROMA and the whole atmosphere is scented for a good distance. It is always the object of favorable comment, and much curiosity is aroused by people passing at night time as to the cause of the delightful perfume in the air. Prefer to satisfy their curiosity. **PRICE 15 CENTS packet, two packets for 25 CENTS, POSTPAID.** JOHNSON SMITH & CO.

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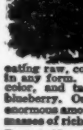
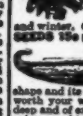


A luscious berry that may be grown as easily from seed in any soil or climate as a tomato. The flavor is fine and unexcelled for eating raw, cooked, canned or preserved in any form. The fruit is blue-black in color, and tastes like a luscious, rich blueberry. One bush will produce an enormous amount of fruit, yielding great masses of rich fruit all Summer and Fall.

Packet, 10c, 3 pkts. for 25c, postpaid.

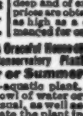
Shoo Fly Plant



A very remarkable Botanical curiosity you should have. Though quite odorless it is said flies will not remain in a room where it is grown. Bears very pretty blossoms; blooms spring and winter. Grows rapidly from seed.

SEEDS 15c pkt., 3 for 40c, postpaid.

Banana Musk Melon



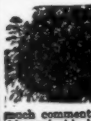
Quite a curiosity. Looks and smells like a banana. Peculiar shape and its delicious flavor makes it well worth your while cultivating. Flesh is deep and of exquisite flavor. Very high prices are obtained in choice city markets, as high as a dollar sometimes being paid for one single specimen. **Seeds 10c, 3 pkts. for 25c.**

The Great Japanese Umbrella Palm A Graceful House or Conservatory Plant

Easily Grown From Seed Winter or Summer

The Japanese Umbrella Palm is a semi-aquatic plant. It is easily grown from seed either in a bowl of water or in very damp soil. Probably the most usual, as well as the most interesting method, is to cultivate the plant in a bowl or jardiniere filled with water, with two or three inches of good garden soil at the bottom. The seeds soon commence to germinate, and the plant shoots up stems two to three feet high, and rapidly produces a most pretty palm-like appearance, as shown in the engraving. The tops of the stems are surrounded by a whorl of umbrella-shaped leaves, of a **WAXY** appearance. We will send a package of this seed, with full instructions for culture, **for only 15c or three packets for 40c postpaid.**

Perfume Plant



Blooms only at night, giving forth the most delightful scented fragrance for quite a distance. Causes much comment. For house or garden. Also valuable because of rare perfume made from it. **SEEDS, 10c packet, 3 for 25c.**

CACTUS FROM SEED

Very curious, odd looking, strange species of plants; will thrive anywhere with little or no care. Flowers are of exquisite beauty and delightfully fragrant. You will be astonished at the odd looks of the Cacti just sprouting. **Packet, 10 cents, three packets for 25c postpaid.**

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THE NEW EDIBLE VEGETABLE WONDER

Grows to astonishing size, the Beans measuring from 3 to 6 feet long, and weighing anything from 10 to 16 lbs. and even more. One Bean is sufficient for a family for several meals. Very palatable and rich in nutritious materials. The delicate buttery flavor is much appreciated. The Vines are easily grown, very prolific, and a most welcome and valuable adjunct to your garden. Try them; you will find them the most delicious vegetable you have ever tasted. Imported direct. Unobtainable elsewhere. Sample packages of Seeds with full directions for cultivating and cooking. **25c, postpaid.**

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Most rapid growing vine known. Will grow 20 feet in one week. Luxuriant foliage, lovely purple flowers; very fragrant. Nothing to equal it for shade purposes and quick growth.

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Yard Long Bean

Produces enormous crop of long, slender, round pods, of excellent quality for soup stock. Pods grow from 1 to 3 feet in length. Very tender and fine flavor. The vines are rampant growers; an interesting, curious, setting. seriously. **Seeds 15c pkt., 2 for 40c**

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Fundamentals of Model Airplane Building

(Continued from page 10)

Show me a poorly assembled model and I'll show you a poor flier. If you were ever patient in any work, be so now for it is vitally important to the success of your entire work.

Study the illustration in Fig. 1 showing the completed and assembled model. *Note where each part is located.* Choose one end of the fuselage stick and mark it for the front. From this end, measure 3-11/16" and mark. This point is the center of gravity when the glider has been properly balanced with the wire. Measure 7½" from either end of the wing and mark. This should be its exact center. Draw a line from side to side. Measure from one end of the elevation wing block a distance of 1" and mark. This mark and the center of gravity mark on the stick must be directly in line with each other when the block is in proper place on the stick, as shown in the "Side View" of the plans under "C.G."

Coat the bottom edge of this block with cement, place it in position on the stick so that the mark on the block and the mark on the stick come together, and hold in position with two model pins thrust through the stick and up into the edge of the block. Allow the pins to protrude so that they can be easily removed. The wing is then cemented on top of the block so that its edges match the edges of the block and the center line of the wing comes exactly in the center of the block's upper edge.

Test to see that the wing is level with the stick and at right angles to it. Model pins may hold it in place until the cement has hardened. Allow fifteen minutes before removing the pins. The "tail unit" which consists of the elevator and rudder, is now assembled.

Find the exact center of the elevator by measuring 3" from either of its ends along its longest edge. Mark and then draw a line from side to side. Coat the rudder with cement along its squared end and place along the center line of the elevator so that the rudder is directly centered on it. See that the rudder and elevator form right angles. Hold by pushing model pins through the elevator and up into the edge of the rudder. When thoroughly hardened, the pins are removed and the unit assembled on the stick. This is done with the rubber band and is shown in Fig. 6 in three steps. Pass the rubber band over the end of the stick and work it along until in front of the elevator when in place. Place the elevator in place on the stick so that its trailing edge is about ¼" in from the end of the stick. This is shown in Fig. 6 "A." The loop of the band is now stretched over the elevator and rudder and brought under the end of the stick, as in "B." In "C" is shown the elevator in place held by the rubber band. In these illustrations, the rudder is purposely left off the elevator to make the picture more clear.

Balancing

The glider must now be properly balanced. This is done by wrapping soft wire around the end of the stick as shown in the plans. Just enough of the wire should be wrapped around the stick to make the entire model balance evenly on its point of center of gravity. Start wrapping wire around the end of the stick. Balance the model at the exact point marked on the stick as the center of gravity. When the balancing is perfectly even, stop wrapping.

The small elevation block for the elevator is used to obtain angle for this surface, which in turn will regulate the climb of the glider. By pushing the block well under the elevator, the glider will tend to climb. By pulling the block back so that less height is given to the rear portion of the elevator, the climb is lessened. If the glider should still climb too steeply and then tend to stall, this may be corrected by adding a little more weight to its nose, which is done by adding wire around the end of the stick.

The elevator block, when once properly set, should be cemented in place on the stick, but do not cement the elevator to it. This is held with the rubber bands. Launch your model from a hill or high elevation.

NRA

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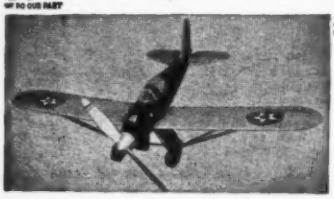

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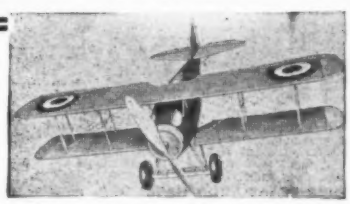

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3/32 x 3/32	9 for 5c
1/8 x 1/8	8 for 5c
1/8 x 1/4	6 for 5c
3/16 x 3/16	6 for 10c
3/16 x 5/16	6 for 12c
1/4 x 1/4	6 for 12c
1/4 x 1/2	5 for 12c
1/2 x 1/2	2 for 10c
1/2 x 1	1 for 6c
1 x 1	1 for 8c

24" SHEETS

1/100 x 2	1 for 7c
1/64 x 2	1 for 6c
1/32 x 2	1 for 3c
1/16 x 2	1 for 3c
3/32 x 2	1 for 4c
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for 2	elastics 40c
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Bamboo 1/16 diam.	1c ea.

PROP BLOCKS

4"	5 for 4c
5"	5 for 5c
6"	4 for 5c
7"	3 for 6c
8"	3 for 7c
9"	3 for 8c
10"	2 for 9c
11"	2 for 11c
12"	2 for 13c
14"	2 for 15c
16"	2 for 17c
18"	2 for 20c

STRAIGHT MUSIC WIRE
No. 5-6-8-10-12-14-16-18
2 ft. lengths 1c each

THRUST BEARINGS
Large or small 2c each
20c dozen

WASHERS
3/32 diam. .....4c dozen
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PROPELLER CARVING KNIVES
50c each

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Small for 1" wheel or ¾ diam. 20c pr.
Large for 1⅜ or 1⅝" 30c pr.

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¾	6c Pr.
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1½	10c Pr.
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Hand Carved
4" diam 6c

5" diam.	8c
6" diam.	10c
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2 Prop. blocks	.03
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1	inch diam. 15c
1½	inch diam. 20c
2	inch diam. 25c
2½	inch diam. 28c
3	inch diam. 30c
4	inch diam. 32c

ALUM. WHEELS

1"	diam. 10c Pr.
1¼"	diam. 16c Pr.

RUBBER TIRED ALUM. DISC. WHEELS

1½	inch diam. 20c Pr.
1¾	inch diam. 25c Pr.
2	inch diam. 30c Pr.

PARA RUBBER

1/32 sq. 50 ft.	10c
.045 sq. 50 ft.	15c
3/64 flat 50 ft.	16c
1/16 flat 50 ft.	18c
3/32 flat 50 ft.	20c
1/8 flat 50 ft.	24c
3/16 flat 50 ft.	30c

ALUM. TUBING

1/16 O. D. per ft.	5c
3/32 O. D. per ft.	6c
1/8 O. D. per ft.	7c
3/16 O. D. per ft.	11c

ALUM. SHEET

.006 sq. ft.	12c
.008 sq. ft.	14c
.010 sq. ft.	16c
.013 sq. ft.	20c

BRASS ROD
1/16 O. D. ..... 5c ft.

BRASS TUBING
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Colored 7c each
Superfine Silk tissue 5c ea.

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Pure, light, strong; grey and orange only, sq. yd. 50c

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1 oz. bottle 8c
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Large bottle 5c
6 inch tube 16c
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1⅜"	diam. 11c Pr.
1⅝"	diam. 17c Pr.
3¼"	diam. 28c Pr.

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4 for 3c

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1⅛"	diam. 20c
2"	diam. 26c
3"	diam. 35c

3" Motor and Drag ring combination... 35c
4" diam. 45c

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NC 10 Curtiss Pursuit
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NC 14 Hawks' Sky Chief
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NC 17 Curtiss A8 Shrike
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He'll tell you he uses nothing but MRL Special Brown Rubber, because it gives 30% MORE POWER and 10% MORE WINDS to his ships. Gorden Stuart writes, "Your ¼ flat MRL Rubber enabled my outdoor commercial to win **first place** in the State Fair Meet." And W. B. Mackley writes, "MRL Rubber nearly **doubled** the flying time of my indoor model." Follow the choice of experts —give YOUR OWN SHIPS a real chance to show what they can do! Try just one flight with MRL Special Brown Rubber, and **see for yourself** the astonishing improvement! MRL Special holds every official indoor and outdoor record! A size for every ship, all prices postpaid per skein, each size 1/30" thick.

1/50	30c	3/32	60c	5/32	85c
1/32	30c	7/64	70c	11/64	90c
3/64	35c	1/8	70c	3/16	95c
1/16	40c	9/64	75c	1/4	$1.20
5/64	50c				

MRL MICROFILM SOLUTION, already the most popular on the market, has now been further improved! 75-100 sheets per 3 ounce can. 3 oz.—30c; 8 oz.—70c; 16 oz. $1.25.

FOR LONG FLIGHTS your rubber motor MUST be lubricated. MRL Special Rubber Lubricant guarantees good results. Prices same as for Microfilm Solution.

WORLD'S FINEST BALSA—same stock as used in record-holding indoor ships—orders taken.

Catalog on wood, rubber, film, lube, free on request. All Prices Postpaid. No orders under 60c accepted. Dealers, Clubs, Write for Special Offer.

MODEL RESEARCH LABORATORY
138 Lathrop St. Madison, Wisconsin
Formerly Englewood, N. J.

The Aerodynamic Design of the Model Plane

(Continued from page 38)

the wing and the tail the flatter the arc will be and the less the plane will be nosed upward before recovery takes place. Slow flying speed will also help to keep the plane from zooming upward excessively. In other words, it is essential to have the difference in angle as small as possible and yet retain stability. The only way to do this is to increase the righting effect of the stabilizer by *increasing its area* instead of increasing the difference in angle between it and the wing. A three degree difference is usually the limit when the wing is approximately on the line of thrust. If you must have greater stability, increase the stabilizer area, unless you can lengthen the moment arm (M) of the stabilizer.

Lengthening the moment arm is not always possible after the plane is built and you have discovered that greater stability is necessary. However, let us consider the effect of the moment arm. A force of 1 oz. upward on the stabilizer acting at a distance (M) of 12 inches from the center of gravity (G), Fig. No. 96, has a leverage, or a moment of, (1x12), or 12, inch ounces. Now, if the distance M is 18 inches, the moment would be; (1x18) or 18 inch ounces, fifty per cent more than the first case. This greater moment would "pry" the plane back to its normal flight position more quickly because of its greater intensity. Conversely, if the moment arm is shorter the corrective tendency will be less effective. A good example of what small tail surfaces and a short moment arm will do to a well *built* airplane and a good pilot has been demonstrated very vividly in the deaths of Lowell Bayles and Mr. Granville. Personally I believe that if Mr. Granville had mastered the art of model design and flying he would be alive today. He would have known better than to fly a plane with a short longitudinal moment arm and small tail surfaces.

For further facts and data relative to the action of the moment arm of the stabilizer, read Article No. 15, in the April 1933 issue.

Air Ways—Here and There

(Continued from page 23)

neat looking job. Scherr has been very meager with information concerning it, so we cannot tell you more about it.

William T. Howell of 6008 Lakewood Ave., Detroit, Mich, is a fine workman. This may readily be appreciated by an examination of picture No. 9, which shows a detail scale D. H. 4. Howell tells us it is absolutely complete with four light bombs, two one-hundred lb. bombs in the racks under the wings, twin Lewis guns on the rear pit, two fixed Marlin guns on the front pit, shock absorbers, lights, front and rear instrument boards covered with glass, windshields, padding, venturi tube, gun sight, radiator, real exhaust manifolds, controls and a real laminated wood propeller made of light and dark mahogany. The only thing that seems to be lacking is the dirt on the tires and it would not be very difficult to provide this

JAPANESE MODEL AIRPLANE TISSUE

In 32 colors
Direct Mill Importers for the Trade.
WHITFIELD PAPER WORKS
12 VESTRY ST., New York City
Established 1869

Reference from California—"Your sample booklet was a pleasant surprise and we are grateful for your promptness in answering our letter to you. Please send the following order:"

Ask for WHITFIELD'S
It's the best! — Brilliant and Thin!

We Pay Shipping Charges

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BIG MONEY Assembling NEW BOAT IN 2 DAYS

$6 Double-blade paddle now GIVEN with your Ki-Yak — if you hurry!

Make big money on each 15 lb. Mead Ki-Yak pre-assembly at home or in spare time. Complete "ready-to-float" Kit, $15.75 F. O. B. Factory (3-Seater, $19.50) Cost $35. Worthy Fun! Overpower thing afloat. Complete Sailing Rig, a few dollars extra. Send 10c for Illustrated Folder and Free 16 Page Catalog!

MEAD GLIDERS Dept. K U.S. Outlet CHICAGO, ILL.

Solid Scale Model

New B/J P-85 Fighter

Wingspan ..... 7⅛"

Material, plans, rubber-tire wheels, cement, four bottles paint, insignia, prop., cell., bamboo, all wood parts cut out, wire, semi-finished cowling, sandpaper.

Plus 5 cents postage Price **25c**

ALSO
13" Boeing 247
12" Supermarine S.6.B.
16" Boeing P26
13" Northrop Gamma

60c Each Postpaid

Material is the same as in the above kit
Cash or Money Order

Model Airplane Supply
3638 Oak Park Ave. Berwyn, Illinois

FREE! With each $1.00 order or over a 12 inch flying model kit given (Hell Diver, Arrow Sportster, Gee Bee "D," P. T. Army Trainer, Boeing Bomber, DeHaviland and Monocoupe).

18" Balsa Strips

1/16x1/16	20 for 5c
1/16x1/8	16 for 5c
1/16x3/16	14 for 5c
1/16x1/4	12 for 5c
1/8x1/8	10 for 5c
1/8x3/16	8 for 5c

Balsa Prop Blocks

3/8x1/2x5	6 for 5c
1/2x3/4x5	5 for 5c
1/2x3/4x6	4 for 5c
5/8x1x7	2 for 5c
5/8x1x8	3 for 5c

18" Balsa Sheets

1/32x2	4 for 7c
1/16x2	4 for 9c
1/8x2	2 for 6c
3/16x2	2 for 8c
1/4x2	2 for 10c

18" Balsa Planks

1x2	1 for 10c
1x3	1 for 15c
1x6	1 for 30c
2x2	1 for 20c
2x3	1 for 25c
2x6	1 for 45c

Cement: 2 oz. 17c, 4 oz. 32c. **Colored Dope:** 2 oz. 15c, 4 oz. 20c. **Japanese Tissue:** white, 3 for 5c; colored, 2c each. **Celluloid Wheels:** ¾" diam. 6c, 1" diam. 8c, 1¼" diam. 11c, 1⅝" diam. 17c. **Dummy Engines:** 1½" diam. 20c, 2" diam. 25c, 3" diam. 35c. 3" Diam. Cowl and Motor Assembly, 35c. **Celluloid Balloon Wheels:** 1½" diam. 11c, 1⅝" diam. 17c. **Aluminum Cowlings:** 1¼" diam. 22c, 2" diam. 25c, 2½" diam. 28c, 3" diam. 32c. **Aluminum Rings:** 1½" diam. 20c, 2" diam. 25c, 2½" diam. 28c, 3" diam. 30c. **Washers:** ⅛" or ¼" 2c doz. **Celluloid Pants:** small pair 25c, large 35c. **Thrust Bearings,** large or small, 3c each.

How to Order: No orders under 50c accepted. Add 15c for packing and postage. Orders over $1.50 add 10%. Canadian orders 25c extra. No stamps accepted.

Dealers and Clubs write for big discounts. Send 3c stamp for a complete price list.

OVINGTON MODEL AIRPLANE SUPPLY CO.
7015 13th Avenue Brooklyn, New York

detail. I am surprised that Howell has not told us that there are miniature valves in the tires. Perhaps he overlooked this. We rate this as one of the finest jobs that has ever appeared in the magazine.

CLUB NEWS

Bamberger Aero Club

The Bamberger Aero Club has come out of hiding. For several months they have kept as quiet as if they had been in the wilds of Africa. However, it appears that they have been very busy doing things with models instead of talking about them. The chief occupation during their hibernating period has been the construction and test flying of a couple of gas jobs. Picture No. 10 shows the first gas engine plane; a model of a Curtiss Jr. being groomed for a flight by Welcome Bender Jr., Lieut. Richard Aldworth, manager of Newark Airport and the famous Casey Jones. (Reading frm left to right).

A few moments later the view shown in picture No. 11 was taken. The results of the test of this ship showed it to be rather under-powered for the weight, so a second model was started.

Picture No. 12 shows the Bamberger Aero Club's gas model number two, built by James Condon Jr. and Alfred Huber. In this ship the builders abandoned the Curtiss Jr. design and proceeded to build a gas job along the lines which have been proved best by other experimenters. You will note the high wing. Recently this job flew for 13 minutes and reached a height of about 2000 ft. Don't let this discourage you experimenters who are trying to get along in this field.

Scale Model Contest

The Bamberger Club is sponsoring a number of meets in the near future. One of them is the New Jersey Official Championship Scale Model Contest to be held May 26 to June 2.

The following events will be held:

A. Models not over six inch wing span.
B. Models larger than Event "A" but not over 12 inches wing span.
C. Models larger than Event "B" but not over 24 inches wing span.
D. Models over 24 inches wing span.
E. Models of any size of Commander Frank Hawks' Texaco Sky Chief, (Northrop Gamma).

Special prizes will be awarded to con-

(Continued on page 48)

Eastern States Outdoor Contest

(Continued from page 21)

model's length squared or $(L/10)^2$. Length in this case is taken as the overall length of the model, not including the propeller. Model must have main supporting surfaces (wings) of 100 sq. in. or more, but not more than 150 sq. in. in effective area. The complete model, ready to fly, shall weigh not less than 1 oz. avoirdupois for each 50 sq. in. of effective wing area. The motor shall be contained entirely within the model. Outriggers and boom may be used on fuselage type models. The fuselage should be a construction which supports the motor, wings, empennage, and landing gear.

Stick Model Endurance

Any model which does not come under the classification of fuselage model, gas model or scale model, may be flown in this event, subject to the following qualifications:

It must have 100 or more sq. in. and not over 150 sq. in. of wing area. It shall weigh, complete and ready to fly, not less than 1 oz. avoirdupois for each 50 sq. in. of effective wing area. This model must be hand-launched.

Gas Engine Endurance

Any model powered with an internal combustion engine may be entered in this event, with the following limitations:

The total weight of the airplane shall not exceed 7 lb.

The amount of fuel carried is not to exceed ⅛ oz. per lb. The term "fuel" is interpreted as the mixture which is forced into the cylinder or cylinders.

Let your model building friends and club members know of this All Eastern States Outdoor Meet. Send to Universal Model Airplane News, 551 Fifth Avenue, New York City, or to Mr. Irwin Polk, c/o Bamberger Aero Club, Market St., Newark, N. J., for registration blanks and further information. Stamped, return addressed envelopes must be sent with your request; otherwise blanks will not be forwarded.

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Balsa 18" Lengths

1/16x1/16	20 for .05
1/16x1/8	16 for .05
1/16x1/4	12 for .05
1/8 x1/8	10 for .05
1/8 x3/16	8 for .05
1/8 x1/4	6 for .05
3/16x3/16	3 for .05
3/16x1/4	3 for .05
1/4 x1/4	3 for .06
1/4 x3/8	3 for .07
3/8 x3/8	2 for .05
1/2 x1/2	2 for .06
1x1	.08

Sheets—18" Lengths

1/32x1	2 for .03
1/32x2	4 for .07
1/16x1	2 for .04
1/16x2	4 for .09
1/8 x1	2 for .05
1/8 x2	2 for .06
3/16x1	2 for .06
3/16x2	2 for .08
1/4 x1	2 for .07
1/4 x2	2 for .10
1/2 x1	3 for .10
1/2 x2	2 for .15

Plank Balsa

1x2x18	.12
1x3x18	.15
1x6x18	.25
2x2x18	.20
2x3x18	.25
2x6x18	.45

Sandpaper

2 Sheets ..... .05

Majestic Mechanic Says ...

A good covering job on the wing may be obtained by placing the cement on the leading edge, trailing edge, and the two ends, and not on the ribs. After the paper is placed on, clear dope or water may be used to take out any wrinkles or sagging.

Propeller Blocks

1/2x3/4x5	5 for .05
1/2x3/4x6	4 for .05
5/8x1 x7	3 for .06
5/8x1 x8	3 for .07
5/8x1 1/8x10	3 for .08
3/4x1 1/8x11	2 for .11
5/8x1 1/4x12	2 for .13
7/8x1 1/2x12	2 for .15
1 x1 1/2x13	2 for .16
7/8x1 1/2x14	2 for .17
1 x1 3/8x16	1 for .15

Dowels 18" Lengths

1/8	.01½
3/16	.02
1/4	.02½

Bamboo

1/16x1/4x11. Each.	.01
Per Doz.	.07
1/16x1/4x8. Each	.00½
Per Doz.	.05

Shredded Bamboo

1/64x1/64. Doz.	.04
1/32x1/32. Doz.	.05

Japanese Tissue

White 20x24	3 for .08
Doz.	.27

Colored Tissue

Blue, Red, Brown, Orange. Sheet	.07
Doz.	.75

XTRA FINE TISSUE

20x15	.05
Doz.	.50

Celluloid Wheels

¾", Pair	.06
1", Pair	.08
1⅛", Pair	.11
1⅜", Pair	.17

Celluloid Balloon Tire Wheels

1⅜", Pair	.17
1⅞", Pair	.20

FREE A LARGE 2 oz. TUBE Majestic Cement on all orders amounting to $1.00 or over.

IN ADDITION TO OUR FREE POSTAGE OFFER.

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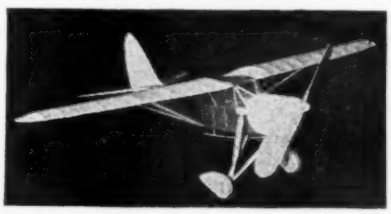

DE HAVILLAND LEOPARD MOTH 20" Flying Scale

This kit contains all material needed to build the beautiful 2 colored Leopard Moth, including all ribs and bulkheads, clearly printed on the finest grade "A" sheet balsa, generous supply of Majestic cement, 2 sheets colored tissue, rubber motor, ready drilled balsa wheels, wire for fittings, reed, sheet celluloid, nose block, etc. Also contained in this kit a three view full sized pla.. with full and simplified instructions. Value without a doubt seventy-five cents. Our price to you only..... **39c** POSTPAID IN U. S. A.

Music Wire

Sizes: .014, .020, .028, .034, 2 Feet. .01

Dummy Motors

1⅛" Diam.	.20
3" Diam.	.35

Turned Balsa Wheels

1", Pair	.05
1⅛", Pair	.08
1½", Pair	.10
2", Pair	.12

Rubber

1/32 Sq.	50 ft. .12
1/16 Sq.	50 ft. .16
1/8 Flat	25 ft. .12
3/16 Flat	25 ft. .15
3/32 Flat	25 ft. .10

Aluminum Items Tubing

1/8 O. D.	ft. .07
3/16 O. D.	ft. .11
1/4 O. D.	ft. .13

Drag Rings

1"	.15
1½"	.15
2"	.19
2½"	.23
3"	.28

Sheet Aluminum

12" Wide, .003	ft. .12
12" Wide, .005	ft. .15

N. A. C. A. Cowlings

1"	.15
1½"	.15
2"	.19
2½"	.23
3"	.29

Washers

Large Size:

¼ O. D. Doz.	.02
100 for	.15

Small Size:

⅛ O. D. Doz.	.02
100 for	.15

Sheet Celluloid

Per Sheet ..... .05

Majestic Cement

1 oz. tube	.09
2 oz. tube	.17
4 oz. can	.32

Clear Dope

1 oz.	.08
2 oz.	.13
4 oz.	.20

Colored Dope

Red, Blue, Orange, Yellow, Silver, Black, Olive Drab.

1 oz.	.08
2 oz.	.15
4 oz.	.20

Thinner

2 oz.	.11
4 oz.	.18

Thrust Bearings

Small .025 hole:
Doz. .20 Each .02
Large .035 hole:
Doz. .20 Each .02

Model Making Pins

Package ..... .05

Brushes

Quill	.03
Camels Hair	.05

Plans

De Havilland Leopard Moth 20" Flying Scale..... .10

Reed

1/16 or 1/8..... 1 ft. .01

Bushings

4 for..... .02

HOW TO ORDER

We pay postage on all orders in the United States amounting to $1.00 or over. We do not accept C. O. D.s or foreign money. All Canadian orders 25c additional for package postage. All orders under $1.00 add 15c for package and postage. Add 10c additional when plank balsa is ordered. Free offer good only on orders amounting to $1.00 or over for supplies only. Do not include price of kit as part of offer for free goods.

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COMPLETE Curtiss Robin kit, 12" span. Amazing flyer 20c postpaid. Half hour to build. Alpine, 4912 13th Ave., Bklyn., N. Y.

SEND 5c for price list and receive free 20" flying scale model plan. Berkeley Model Supplies, 53 Berkeley Place, Bklyn., N. Y.

CAMBRIDGE Model Shop, 4 Armory Place, Cambridge, Mass. Complete line of Airplane Supplies. 48 hr. service. Send 3c for price list.

3c STAMP brings catalogue and new low supply prices. Crescent, 8657 B 18th Ave., Bklyn, N. Y.

SEND five cents for Catalog of 200 finished scale models. Genessee Aircraft, 141 Westfield St., Rochester, N. Y.

GENERAL Aristocrat cabin monoplane, 24" flying scale model. Kit complete, $1.50. H.&O. Model Shop, 1734 Oak, New Albany, Indiana.

MINIATURE Aircraft Kits—Spad, Albatross, Bellanca, Lockheed, Northrop, Boeing, each 5c. All six, 25c postpaid. No stamps. Happy Models, Box 40, Ozone Park, N. Y.

FREE! 6" Model Kit, Choice of Lockheed Vega, Boeing P-12 F, Texaco Chief, Spad, Fokker DV-11 and British SE 5. Send 10c for handling. Catalog with model. Heathe Model Airplane Co., 438-N5 E. 98th St., Brooklyn, N. Y.

BALSA Cutter. Cuts strips from 1/32" square to ¼" x ⅝". Safe, accurate, wing nut adjustments. 50c postpaid. Free information on engines for model planes and boats. Robert Hetherington, 4526 Corliss St., Los Angeles, Calif.

FREE Price List. Your address on a postcard brings it. Model Aero Shop, Huntington, N. Y.

SAVE Money! Balsa Scrap bundle. All wood usable. Liberal assortment of strips, sheets, blocks, $2.00 value for 75c postpaid. Limited supply. Model Co., 1140 53rd St., Bklyn., N. Y.

15" FLYING Model kits 30c postpaid. Hawk P6E, Boeing P12F, Vought Corsair, Fokker F-7, D8, Spad, Jenny, 10 other models. Complete line model supplies. 20" Boeing P26; Gee Bee Transport Kits 75c. Dealers something new in kits. It's Hot! Write. Modelcraft, 2125 W. 54th St., Los Angeles, Calif.

ANNOUNCING—Oriole Corben Baby Ace convertible sportplane ¾" Flying scale $1.75 pp. Oriole Model Aircraft Co., 1101 Washington Blvd., Baltimore, Maryland.

CURTISS F9C2—a 19½" model of this ship detailed even to the radio antenna, guns, compass, lights, wheel pants, hook-on gear and all insignia and lettering. Colored grey fuselage, yellow and silver wings and black nose. Drawings 35c postpaid. No stamps. Reynolds Model Aircraft, Box 604, Newton, Iowa.

S & Y MICROFILM: A perfected solution containing no castor oil. Sincerely guaranteed best on market. Forms films that are pliant, extremely tough and absolutely dry. 45 to 70 sheets per 2 oz. bottle. Price, 25c. Smithline & Young, Indoor Builders, 2800 Broadway, New York City.

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LITTLE PROPS. I just found 150 little propellers. They cost $12 to make. I bought them cheap. Now you can buy these real walnut stained propellers 15/8" long for 25c. All are new and shiny. Mount a clock in the hub. Make an ash tray out of one. A nice paper weight or ornament for your desk or wall! Send me 35c plus 15c postage today and mail it right away, as I have only 150 of them and I know that they won't last very long. Send thin dime for a new Aviation Catalogue. Karl Ort, 508 W. Poplar St., York, Pa.

AIRPLANE PHOTOGRAPHS

AIRPLANE Photos, 2½" x 3½" up, and 4 for 15c up. Send stamp for new price list. 200 planes. N. E. D'Apuzzo, 32 St. Marks Place, Bklyn., N. Y.

AIRPLANE Pictures tinted, 3½" x 2½", 10c; 7" square, 25c; larger photographs, 50c. R. W., 417 North Fourteenth, Quincy, Illinois.

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Air Ways—Here and There

(Continued from page 47)

testants entering most six inch Ideal-O-Craft models.

A special prize will be awarded for the best model entered by a contestant not over 10 years of age, on the date of the contest.

Rules

All models must be built and owned by the entrant. They must be brought or shipped to the Bamberger Aero Club headquarters, to arrive not later than May 25. A tag, bearing the name, address and age of the entrant must be securely attached to each model, and, if shipped, to shipping case. A contestant must be under 21 years of age and may enter all events. If shipped, models must be sent prepaid and will be returned, express collect.

Rules and entry blanks may be obtained by writing to Irwin S. Polk, Director, Bamberger Aero Club, Newark, N. J.

Outdoor Contest

On May 19 Bamberger Aero Club and Universal Model Airplane News are jointly sponsoring an Outdoor Contest to be held at Newark Airport, N. J., which will act as eliminations for the National Model Airplane Championships to be held at Akron, Ohio, June 27 to 29.

Model Flying Club of Australia

During the last few months we regret it has been necessary to neglect our Australian brother model builders, due to lack of space in our columns. However, they have been extremely active. One of the important pieces of news from them is that the M. F. C. A. has become a regular member of the National Aeronautic Association. Their contests are now governed by N. A. A. rules. Recently they have done some very intensive work with indoor models. This is a new field for the Australians as they have lacked suitable flying space. Picture No. 14 shows a group of indoor fliers who are assembled in the Capitol Theatre at Sydney to hold their regular indoor contest. Left to right at the top they are Eric Leighton with his microfilm job, Jack Finneran, Australian stick indoor record holder, W. Elleck and E. J. Leighton, indoor fuselage record holder. It seems that the Leightons have the model airplane "it."

To show the progress that is being made with model planes we quote an extract from one of the Sydney papers which Mr. Freshman has been kind enough to send us.

"Two clubs held competitions yesterday—the Model Flying Club, for the 1934 Angus and Coote Cup in Centennial Park, and the Model Aeroplane Association of Australia, for the outdoor championship at Lidcombe. A machine built by M. Martin of Mascot, a competitor in the Angus and Coote Cup, headed westward with Messrs. Freshman and Venables in pursuit in a fast car. They kept the model in sight for 42 minutes and 40 sec."

This record is being certified to the N. A. A. and it is hoped that this organization will establish it as the world's record.

GASOLINE ENGINE FOR MODEL PLANE BUILDERS

Be Ready For
COMPETITION IN COMING MEETS
Power Your New Craft with the
WORLD'S RECORD HOLDING
BROWN JR MOTOR
Has Flown Planes of Five to Eight Feet Wing Spread And Up To Seven Pounds Total Weight
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Sensational Kits 60c postpaid
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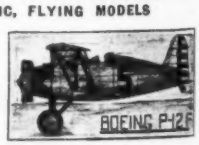
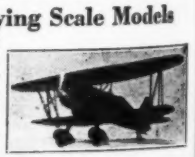
16" SWIFT and 16" BOEING KITS CONTAIN
Printed white balsa, Colored tissue, Aluminum wheels, Colored insignia, Wing lettering, dope, cement, Instrument board, Dummy pilot, Aluminum motor plate on Boeing, Windshield, rubber and other parts.



1934 Catalog, 5 cents

Big 24" Flying Scale Models

Very beautiful flying scale models big enough to make sensational flights. These GIANT ships are a "snap" to build with VIKING'S new tru-size plans, itemized instructions, special balsa templates, and a super quality kit. Kits have everything you need and plenty of it, including aluminum wheels, special insignia, windshields, colored tissue, 2 oz. dope, 2 oz. cement, AAA balsa, contest rubber, etc.



Hawk P6E Kit (illustrated) ..... $1.35 Postpaid
Fokker DVII Kit (not illustrated) ..... 1.25 Postpaid
Boeing 247 Transport (not illustrated) .... 1.00 Postpaid
Dealers, Get Our Prices!!
VIKING AIRCRAFT CO.
DEPT. I-E HAMILTON, OHIO

ENTER THIS GREAT CONTEST!

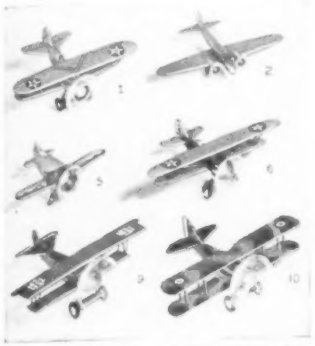
Win one of these Prizes!

Just look at that **FIRST PRIZE!** The very finest **Ranger Bike** that's made—the famous "ACE" Super-DeLuxe Motor Bike with full balloon tires, New Departure Coaster Brake, ball bearing pedals, auto style electric lamp and horn with battery and battery case, red light on rear mud guard, pump, rear carrier, 12-inch Mexican style saddle — ACTUAL VALUE **$55.00.**

1st PRIZE $55 RANGER BIKE

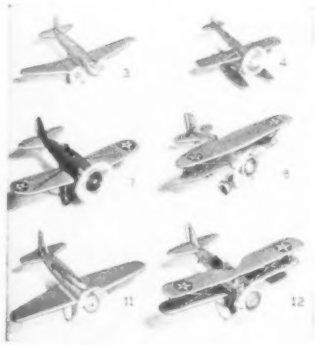
SECOND PRIZE—the famous Keystone Movie Camera and electrically driven movie projector—takes and shows real movies—ACTUAL VALUE—**$37.50.**

THIRD PRIZE—famous Elgin Wrist Watch, 7 jewels, 14K Gold filled case, complete with strap and buckle—ACTUAL VALUE—**$25.00**



1. Boeing Fighter
2. Boeing Transport
3. Douglas Airliner
4. Red Bullet
5. Gee-Bee
6. Curtiss Hawk P6-E
7. Boeing Low Wing
8. Curtiss Goshawk
9. Fokker D-7
10. Spad
11. Northrop Delta
12. Vought Corsair

All 8" wingspan except Nos. 4 and 5—6" wingspan.



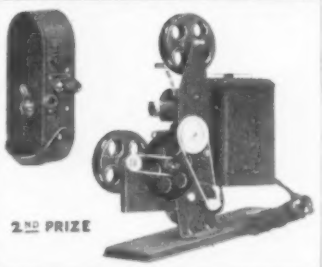
All you have to do is to BUILD ONE or MORE OF THESE SOLID REPLICAS at only 15c EACH

Comet announces a sensational new contest, for the purpose of introducing the new Comet line of solid Replicas at only 15c each! Here are the simple rules in this great contest—anybody can enter—anybody has a chance to win one of the thirty big sensational prizes! Start right now—go to the model airplane dealer in your community and ask for the official Comet Entry Blank!

RULES:

1—Any boy age 15 or under may enter.
2—Models must be solid scale, of types and wingspans shown in this ad; other than Comet models may be entered.
3—Enter as many models as you wish. Only one prize awarded to each contestant.
4—Models will be judged for neatness, accuracy and workmanship.
5—Models will first be judged by dealers and must be in dealer's hands by June 2, 1934.
6—Each dealer will send best three models to Comet to be judged in finals on June 16th.
7—Decisions of judges to be final. In case of tie, duplicate prizes will be awarded.
8—Models are to be left for display at Comet until July 31st, then returned to owners.
9—Rewards will be given shortly after final contest is judged.

MOVING PICTURE
CAMERA+PROJECTOR



2ND PRIZE

WORTH $37.50

ELGIN WRIST WATCH

3RD PRIZE

WORTH $25.00

DEALERS: *Write us for quantity of Entry Blanks—this contest will be a real business-builder for you, if you will co-operate.*

CONTENTS OF KITS

Printed parts on Balsa, colored dope, cement, full-sized plan, and all other parts necessary to build these models. A sensational value at only

15c

OTHER PRIZES

4th Prize—Gilbert Tool Cabinet and Work Bench • **5th**—Eversharp Pen and Pencil Set • **6th**—Tennis Racket • **7th**—Football • **8th**—Wilson Catcher's Mitt • **9th**—Fielder's Glove • **10th**—League Baseball and Louisville Slugger Bat • **11th**—Roller Skates, ball bearing Planert • **Next 9 Prizes**—One Year Subscriptions to Popular Aviation, Model News and Model Aircraft Engineers • **Next 10 Prizes**—Comet Kits, including such well-known models as Vought Corsair, Curtiss Falcon, Wedell Williams, Boeing 247, Curtiss Swift.

If You Don't Want to Enter Contest

but would like to build these new 15c Comet Replica models, buy from your dealer or mail this coupon.

Comet Model Airplane & Supply Co., Dept. MC-44
2509 W. Cermak Road, Chicago

Please send me Replica Kits listed:

(No orders for less than 3 accepted; add 5c postage for each kit if you order less than 6; 6 kits for $1.00, postpaid.)

.....

.....

Name.....

Street and No......

City and State.....

GET ENTRY BLANK FROM YOUR DEALER

Go to the dealer in your community who sells model airplane supplies and ask for the official Comet Entry Blank, which you need to enter this contest. If he does not have these blanks, or if there is no model airplane dealer in your community, mail the coupon at the right to Comet, giving us your dealer's name and address, and we will send him a quantity of these blanks, and notify you when they have been sent, so you can get yours.

If You Want to Enter This Contest

and if your dealer has no entry blanks, or there is no dealer in your community, mail the coupon below. Fill in the name and address of your model airplane dealer, or if there is no model airplane dealer, the name of the leading hardware, bicycle, sporting goods, stationery, drug or department store.

Comet Model Airplane & Supply Co., Dept. MC-44
2509 W. Cermak Road, Chicago

Dealer's Name.....

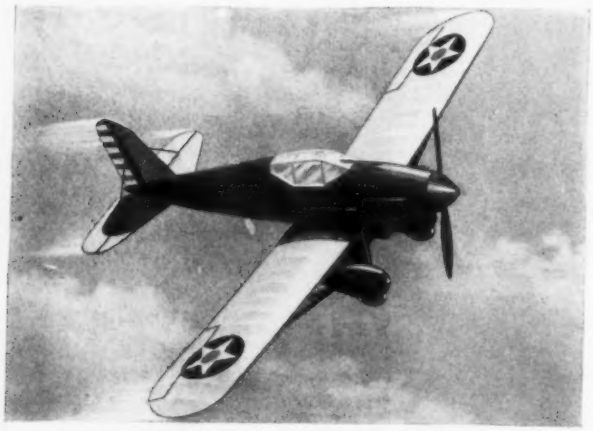
Address.....

Your name.....

Your address.....

COMET—*the* LINE *that* LEADS!

The Newest Models — the Highest Quality — the Biggest Values!



and here's the newest COMET sensation

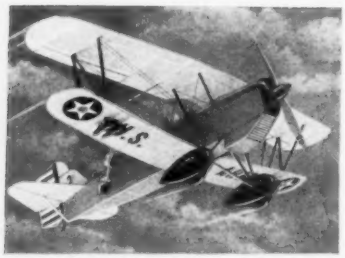
The CURTISS SWIFT

XP—934 Wingspan—15" Length—11"

Army's newest pursuit plane. Strides through the air at terrific speeds, equipped with new death-dealing machine-guns, and bullet proof cockpit enclosure. This Comet model is a remarkable flyer. Full-size plan leaves nothing to guesswork. All details shown with ample, carefully drawn sketches. This partial list gives an idea of what's in the kits Fuselage strips, wing spars, printed formers and ribs, covering tissue, cement, banana liquid, rubber, transparent cockpit covering, machine gun parts, wheel pant cores, printed pant cover plates, wheels, metal fittings and washers, brightly colored army insignia dressings, gun-sight tube, finished balsa propeller spinner, outlined prop design on balsa, plenty of yellow and khaki Nu-Dope, etc. Comet uses best grade of materials—don't confuse with cheap stuff flooding market. The Comet trademark is your guarantee of honest materials and workmanship. Complete **75c**

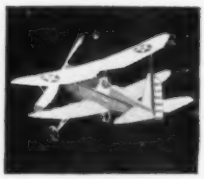
100% Satisfaction Guaranteed—or Money Refunded!

Note These New Low Prices



THE NEW CURTISS FALCON
24" wingspan $1.95

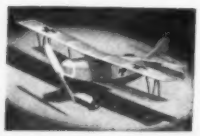
PAGE RACER
12½" wingspan 35c



C-I ARMY PURSUIT
15" wingspan 50c

BOEING TRANSPORT 247
23" wingspan $1.50

CURTISS HAWK
11½" wingspan 35c

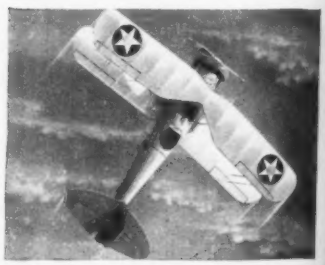


FOKKER D7
15" wingspan 50c

THE NEW WEDELL WILLIAMS
25½" wingspan $1.95

DIPPER
12½" wingspan 35c

ZIPP
15½" wingspan 35c



THE NEW VOUGHT CORSAIR
23" wingspan $2.50

DEALERS seeking new connections — ATTENTION: Comet offers you the quality and completeness you have been accustomed to, plus the greater sales and profit possibilities of Comet's lower prices, made possible by tremendous volume and large-scale manufacturing facilities. Write for catalog, prices and discounts at once!

COMET MODEL AIRPLANE & SUPPLY COMPANY
2559 W. Cermak Road, Dept. M-54 Chicago, U. S. A.

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